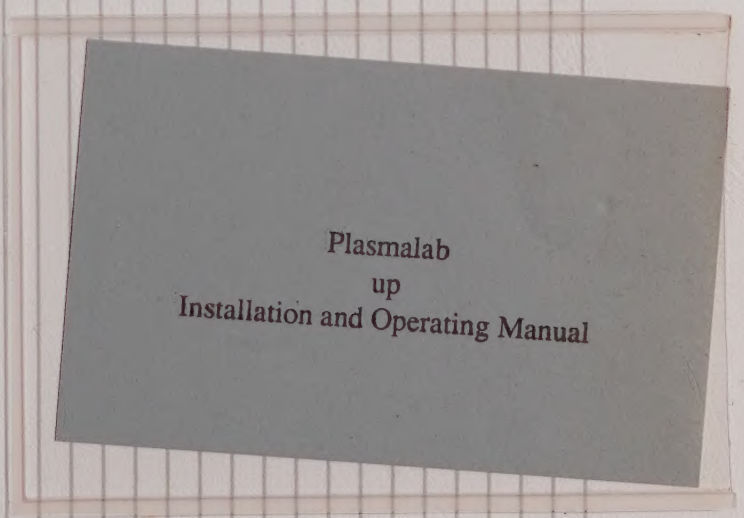
PLASMA
TECHNOLOGY

PRODUCT INFORMATION



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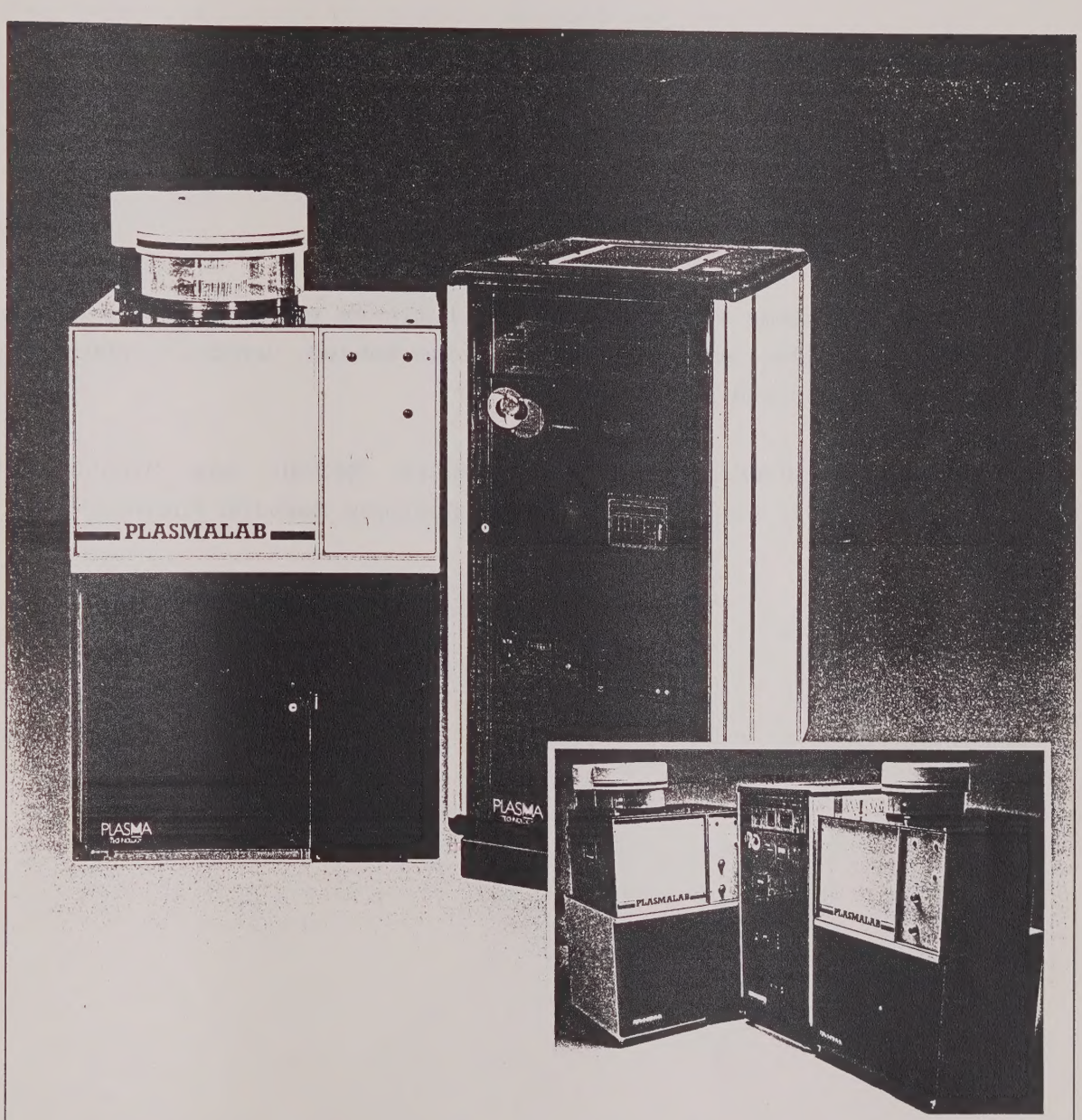
PLASMALAB μP

MODULAR PLASMA SYSTEMS



Total modularity with microprocessor flexibility

PLASMA TECHNOLOGY

INSTALLATION AND

OPERATING MANUAL

A member of The Oxford Instruments Group plc.
Registered in England 1581072

PLASMA TECHNOLOGY

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AMMENDMENT SHEET

All Machines

1st. July, 1987

Where systems are fitted with aluminium chambers it is necessa to fit the port with an edge-bonded window incorporating a UV filter and mesh.

Plasma Technology drawing numbers M4174D and M1655D refer. If in doubt, contact a Plasma Technology Service Engineer.

PLASMALAB UP

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1.

INTRODUCTION

The Plasmalab range of plasma equipment comprises basic modules and options which can be combined to achieve a variety of plasma processing systems, including:

Planar etching

- normally carried out on a grounded substrate electrode with a parallel driven electrode at pressures between 100 millitorr and 1 torr.

Reactive ion etching

- normally carried out with a driven substrate electrode at pressures between 10 and 100 millitorr.

Plasma deposition

- normally carried out on a heated grounded substrate electrode at temperatures between 200 and 400 ^{o}C and pressures between 100 millitorr and 1 torr.

The flexibility of the Plasmalab concept enables systems to be converted from one type to another by the addition of optional equipment.

For this reason the manual covers a wide range of equipment, some of which may not be included on any one system in particular. Check the contents page and the paragraph headings to ensure that the information is relevant to the system in hand. All items of optional equipment and accessories are dealt with fully in section 7. headed 'Optional Equipment'.

This italic typeface indicates optional equipment. Please refer to section 7, for installation and operations details.

2. SAFETY

2.1 ELECTRICAL

As well as mains voltages, the system can have EXPOSED HIGH FREQUENCY CONDUCTORS at voltages of up to 1000 V within the enclosures.

NEVER operate the plasma generator without its cover or when:

- the system rear panels are removed (control rack, mainframe and cabinet)
- mainframe assembly front panel is removed
- the chamber top cover is removed

Control system fault finding must only be undertaken by experienced and competent personnel. In this instance, mains power may be supplied to the system AFTER ensuring that the manual circuit breaker of the external plasma generator is in the 'off' condition.

EXPOSED MAINS CONNECTIONS are to be found:

- on the process timers
- within the control logic rack
- *at the connector of the mass flow controller power supply unit.*

NEVER tamper with the limit switches which detect that the chamber is closed.

2.2 GAS HANDLING.

The Plasmalab range is designed to handle non-toxic process gases supplied from regulated low pressure gas lines.

Although gas lines and manifolds are leak tested to high vacuum standards it is strongly recommended that further safety precautions are taken if dangerous gases are employed, as follows:

- the main cabinet is provided with a nitrogen purge inlet and an extraction facility. This must be used.
- the rotary vacuum pump must also be supplied with a continuous purge.
- the purge exhaust must lead into a suitable extraction system which will withstand any combustion of the exhausted silane.

If toxic dopant gases are to be used, the chamber must be enclosed in a purged glove box assembly. Purge gas extracted from both the glove box and the cabinet should be monitored by a suitable gas detector to give advance warning of any leakage.

The entire system must be situated in a purged or extracted environment with a suitable gas detector. An operator respirator must be made available.

ANY MAINTENANCE WORK involving the gas handling system must be carried out by persons with the knowledge and experience to ensure that the system is:

- completely purged BEFORE maintenance is started:
- suitably leak tested AFTER maintenance is completed.

CHECK PROCEDURES CAREFULLY

2.3 PROCESS EFFLUENTS

The effluents of all plasma processes should be considered to be toxic. Effluents must be extracted into a safe disposal system from both the vacuum pump and nitrogen load lock enclosure.

To protect operators from residual process effluent while loading the system, use of the load lock enclosure is recommended unless other precautions have been taken in the installation of the system.

Great care must be taken when handling components which have been contaminated with process effluents, such as chamber parts, vacuum pumps and used oil. They should be handled only with gloves and in effective fume cupboards.

2.4 DUAL CHAMBER SYSTEMS

IMPORTANT

Make sure that when using master/slave systems the MASTER/SLAVE keyswitch is removed before any processes are run.

Sect. 3

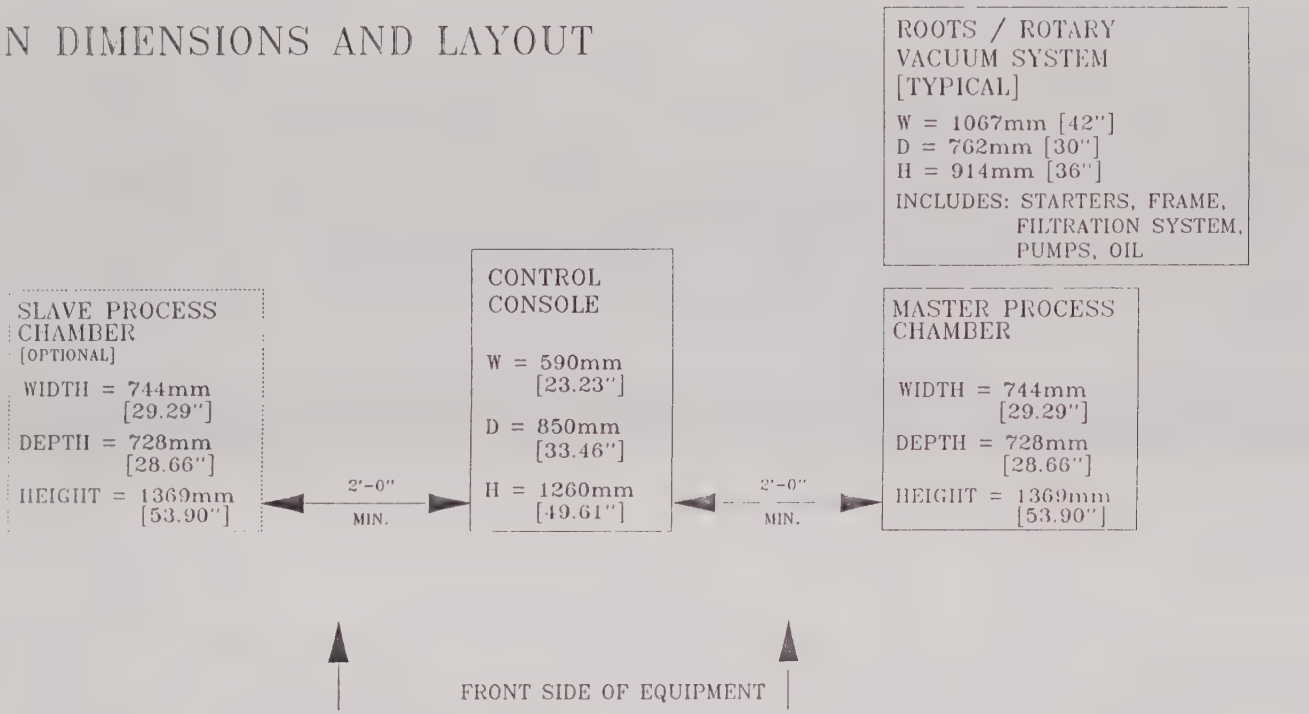
U.S.A. SERVICES

SERVICE REQUIREMENTS for AT&T Bell Labs Job # 891210-M

SERVICE	FUNCTION	CONNECTION	SUPPLY SPECIFICATION
MAINS POWER	Main power unit	Terminal box	208VAC, three phase, 5 wire, 60Hz, 20A
	Rotary Vacuum Pump (23cfm)	Terminal box	115VAC, single phase, 60Hz, 20A
	Gas Pod	Internal	
	Turbomolecular Pump	Internal	
	DC Bias Power Supply	Internal	
	Temperature Control System	NEMA 5-15P	115V, single phase, 60Hz, 12A
WATER AND DRAIN	Chamber Coolant	2 x ¼"SS Swage	30-60 PSI, 1 L/min cool or hot water supply
	Lower Electrode	2 x ¼"SS Swage	30-60 PSI, 1 L/min cool or hot water supply
	Turbomolecular Pump	2 x ¼"SS Swage	0.3 gal/min depending on type; see manufacturer's manual
COMPRESSED AIR	Mainframe Assembly	2 x ¼"SS Swage	90 PSI, filtered, and oiled
	Gas Pod	1 x ¼"SS Swage	90 PSI, filtered, and oiled
NITROGEN	Vent Gas	1 x ¼"SS VCR	7.5 PSI, dry, oxygen-free, 7 L/min
	Cabinet Purge	1 x ¼"SS Swage	7.5 PSI, dry, oxygen-free, 250cc/min
	Gaspod Purge	1 x ¼"SS Swage	7.5 PSI, dry, oxygen-free, 250cc/min
	Nitrogen Loadlock	1 x ¼"SS Swage	7.5 PSI, dry, oxygen-free, 250cc/min
	Rotary Pump Oilbox	1 x ¼"SS Swage	7.5 PSI, dry, oxygen-free, 250cc/min

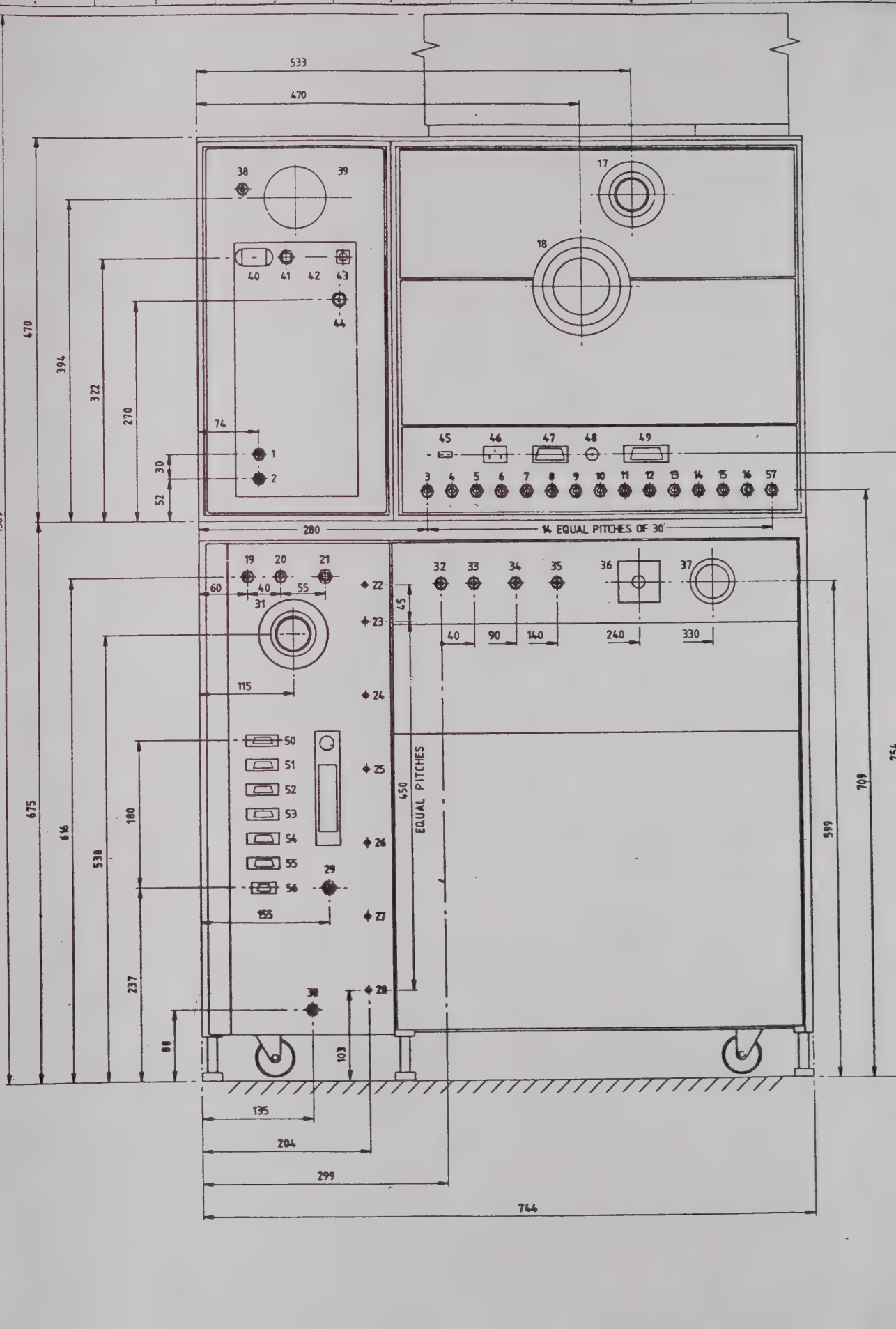
	Rotary Pump Ballast	1 x ¼"SS Swage	7.5 PSI, dry, oxygen-free, 250cc/min
PROCESS GASES	Mainframe Gas Pod and Gas Inlets	¼" SS VCR	15.0 PSI from bottle regulator
EXTRACTION	Flexible Gasline Purge	¼" SS VCR	Lab Extraction System
	Cabinet Purge	NW40	Lab Extraction System
	Loadlock	NW40	Lab Extraction System
	Gas Pod	NW40	Lab Extraction System
	Pump Exhaust	1 x 1" SS Exhaust Flange	Separate Extraction System

MICRO P PLASMALAB
PLAN DIMENSIONS AND LAYOUT



NOTE: EQUIPMENT SHOULD BE PLACED A MINIMUM OF 24"
FROM ANY ADJACENT PROCESS EQUIPMENT

uP PLASMALAB	PLASMA TECHNOLOGY	BY ROS	DATE 08-DEC-89
PLAN VIEW	130A BAKER AVENUE EXT. • CONCORD, MA 01742 PHONE (508) 369-7321 • FAX (508) 371-7505	APP	DWG A-91208-03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14 EQUAL PITCHES OF 30
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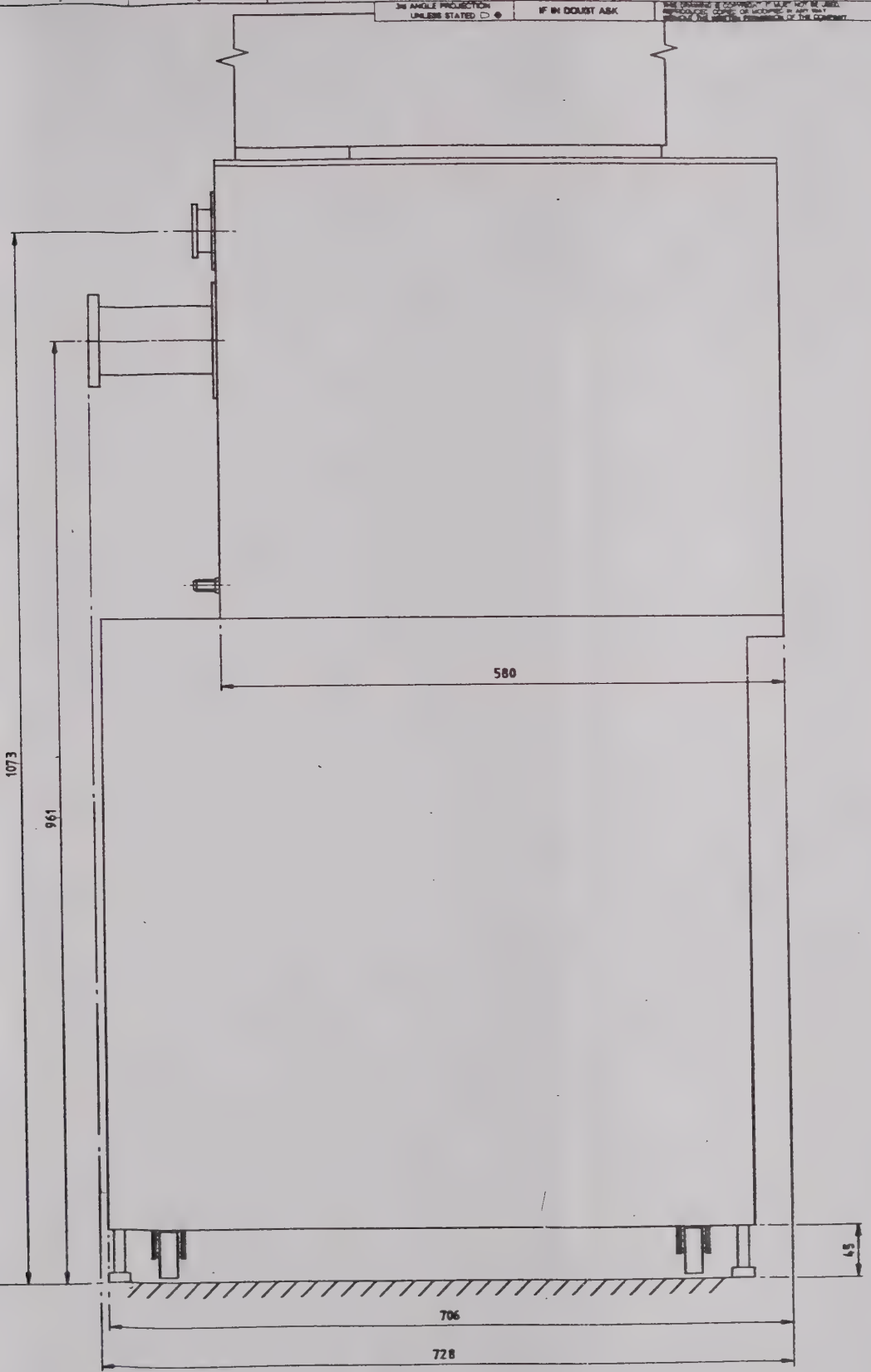
NO.	MODIFICATIONS	ORIG.	DATE
1	INITIAL ISSUE		
2	Item 57 added (see MM-106A)	DC	7/11/86



1 WATER IN A.M.U.
2 WATER OUT A.M.U.
3 CHAMBER COOLANT IN
4 CHAMBER COOLANT OUT
5 TABLE COOLANT IN
6 TABLE COOLANT OUT
7 VALVE AIR 1
8 VALVE AIR 2
9 SPARE
10 AIR IN
11 AIR OUT
12 PURGE OUT
13 PURGE IN
14 GAS OUT
15 GAS 2
16 GAS 1
17 CABINET PURGE OUT
18 PUMP DOWN PORT
19 AIR IN
20 AIR OUT
21 VENT
22 GAS OUT
23 GAS 1
24 GAS 2
25 GAS 3
26 GAS 4
27 GAS 5
28 GAS 6
29 CLEAN GAS IN
30 CABINET PURGE IN
31 CABINET PURGE OUT
32 TURBO COOLANT IN
33 TURBO COOLANT OUT
34 N_2 PURGE TO TURBO IN
35 N_2 PURGE TO TURBO OUT
36 POWER TO TURBO
37 TURBO BACKING
38 N_2 PURGE TO GLOVE BOX
39 EXTRACTION FAN
40 MAINS INPUT TO A.M.U.
41 FUSE
42 RF GROUND
43 RF POWER
44 RF IN
45 THERMOCOUPLE
46 MAINS INPUT
47 BARATRON
48 EXTERNAL VALVE DRIVE
49 MACHINE CONTROL FUNCTIONS
50 GAS 1 CONTROL SIGNALS
51 GAS 2 CONTROL SIGNALS
52 GAS 3 CONTROL SIGNALS
53 GAS 4 CONTROL SIGNALS
54 GAS 5 CONTROL SIGNALS
55 GAS 6 CONTROL SIGNALS
56 CLEAN GAS CONTROL SIGNALS
⚠57 VENT CHAMBER

ITEM NO.	PART NO.	MAT'L	NO. OFF	DESCRIPTION			
SPECIAL INSTRUCTIONS				MATERIAL			
				MACHINED		FINISH	
				FINISH			
				Machine Break		FINISH	
				FINISH			

PLASMA TECHNOLOGY (UK) LTD.

SCALE 1:2	VIEW ON REAR OF MICRO MACHINE SHOWING OVERALL DIMENSIONS AND POSITION OF SERVICES	J.D.C. 17-11-86	80 MICRO
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4. BASIC SYSTEM DESCRIPTION (refer to illustration 1.)

This section describes the basic units in the plasmalab up system:

- Mainframe assembly and supporting cabinet

- Control rack

- Planar chamber assembly.

Descriptions of all optional equipment and accessories are to be found under the appropriate item headings in section 7.

4.1. THE MAINFRAME ASSEMBLY (refer to illustartion 8.)

The mainframe assembly consists of a welded steel cabinet which contains:

- Process gas outlet manifold

- Rear bulkhead fittings for:
  - process gases
  - compressed air
  - *nitrogen purge*
  - *chamber coolant*
  - *table coolant*
  - *turbo pump coolant*

The mainframe assembly is positioned on a small cabinet *which may contain a turbo pump if necessary*.

The supporting cabinet has its own rear services panel which bears connection points for:

- main machine functions loom
- *capacitance manometer*
- *roughing gate valve lead*
- *turbo pump control lead*
- *automatic pressure controller connection lead*
- *turbo backing pump flexible steel pipe*

Note: On some systems the foregoing may be situated on the mainfame assembly itself above the rear bulkhead fittings.

4.2. THE CONTROL RACK (refer to illustrations 3 - 9)

The control rack is a free-standing cabinet usually positioned to the right hand side of the mainframe assembly.

It contains the following systems:

- microprocessor
- accessories box:
  - *emergency stop button*
  - *DC bias readout*
  - *penning gauge*
  - *master / slave switching unit*
- power box
- generator
- *automatic pressure controller*
- *DC bias power supply*
- *turbo pump control unit*
- *temperature controller*
- *residual gas analyser*
- *end point detector*

All input power to the system is supplied via a heavy duty 3-core cable to the mains power distribution box, positioned to the rear base of the control rack.

4.3 THE PLANAR CHAMBER ASSEMBLY (refer to illustration 1.)

The complete chamber assembly is mounted from a solid aluminium cabinet top plate which is bolted to the top of the mainframe assembly.

The 'chamber assembly' comprises:

- hoist
- chamber baseplate
- chamber
- electrode assemblies
- high vacuum valve and pumping outlet and throttle valve.

The underside of the chamber baseplate is mounted on to the aluminium top-plate and 'O' ring sealed to the pumping outlet tube which carries the hivac valve with its associated outlet tube, and the manual screw-down throttle valve.

Four holes in the chamber baseplate carry the threaded feedthroughs which 'O' ring seal to the baseplate on the vacuum side. There are secondary 'O' ring seals to the legs of the lower electrode which allow for height adjustment.

Two other holes in the baseplate have $\frac{1}{4}$" swage fittings for gauge and leak test connections.

The pneumatic hoist is mounted towards the rear of the top-plate on the left hand side. It elevates the upper electrode and chamber assembly for loading.

The *pyrex* chamber cylinder seals on retained 'O' rings in the upper electrode and baseplate. It is supported from the upper electrode on polypropylene blocks which also electrically isolate the upper electrode.

In the centre of the upper electrode is a hole which carries a replaceable gas inlet disc situated flush with the underside surface. The gas is supplied via an 'O' ring sealed gas inlet assembly.

The gas inlet assembly comprises a stainless steel plate, carrying a VCO fitting above a thick insulating cyclindrical spacer. Gas flows through the spacer to the gas inlet disc.

The gas inlet assembly is supplied by a gas inlet line passing up the hoist column. It is connected to the gas inlet manifold in the mainframe assembly by means of double walled flexible tubing, with the outer cavity extracted for safety.

The upper electrode coolant connections are supplied from lines passing up the hoist column. They are connected to the appropriate bulkhead fittings on the right hand services plate of the mainframe assembly cabinet.

The Plasmalab planar chamber assembly may be operated in two distinct modes as far as the electrical connection of the electrodes is concerned:

1. the planar etch/plasma deposition mode

2. the reactive ion etch mode.

In the planar etch/plasma deposition mode the upper electrode is driven by either an HF or LF generator and the lower electrode is connected to ground. This mode is achieved by making the RF connection from the lead passing up the hoist column to one of the gas inlet assembly bolts. The ground connection is then made between the lower electrode leg and the main earth block. For a fuller description of the wiring for this mode see the appropriate optional equipment sub-sections.

In the reactive ion etch mode an HF generator operating in the 13.56MHz range is usually employed. The lower electrode is driven and the upper electrode is grounded. The RF connection is made from the impedance matching unit to the lower electrode leg and the top electrode is grounded by an earth to the hoist column. For a fuller description of the wiring for this mode see the appropriate optional equipment sub-sections.

ONLY SYSTEMS EQUIPPED WITH A RIE KIT CAN BE OPERATED WITH HF GENERATORS as the RIE kit includes all the RF interference suppression parts. For a full description of the wiring for HF applications, see the appropriate optional equipment sub-sections.

When a RIE kit is fitted to a planar chamber assembly, a dark space shield is installed below the lower electrode to eliminate unwanted discharge effects. For the method of converting from RIE operation to planar etch/plasma deposition mode see sub-section 7.1.i. which includes information on wiring alterations and dark space shield removal.

5. BASIC SYSTEM ASSEMBLY AND INSTALLATION

Unpack all the equipment.

Identify the basic system units from the illustrations and exploded drawings.

Consult the appropriate descriptions in section 4..

Section 5 covers the assembly and installation of the basic units:

- mainframe assembly and supporting cabinet
- control rack
- planar chamber assembly

Assembly and installation of all optional equipment and accessories is covered under the appropriate item headings in section 7..

5.1 INSTALLATION OF THE MAINFRAME ASSEMBLY AND SUPPORTING CABINET

The mainframe assembly and supporting cabinet are shipped together as a complete unit.

To the rear of the unit make the supply connections as follows:

- Take the amphenol type connector on lead SKT66 (main machine functions) from the rear services panel of the control rack. Fit it to the amphenol connector labelled SKT66 positioned to the lower right hand side of the supporting cabinet rear services panel.

- Locate the CM gauge 9-way D-type plug on lead SKT67 at the rear services panel of the control rack. Fit it to the connection labelled SKT67 at the centre of the supporting cabinet rear services panel.

- *Locate the roughing gate valve lead to the top of the gate valve. Connect the QM 4-way plug on the lead to its connecting point on the supporting cabinet rear services panel to the left of the SKT66 connection.*

- *Locate the turbo pump control lead at the control rack rear services panel (fed through port labelled 'turbo' to the centre right of the panel). Depending on the type of turbo pump, it will have EITHER a 19-way amphenol connector OR a Bulgin 8-way socket. Both leads are grey. Feed the lead through the port at the base of the supporting cabinet rear services panel and fit it to the connecting point on the turbo pump (located within the supporting cabinet itself).*

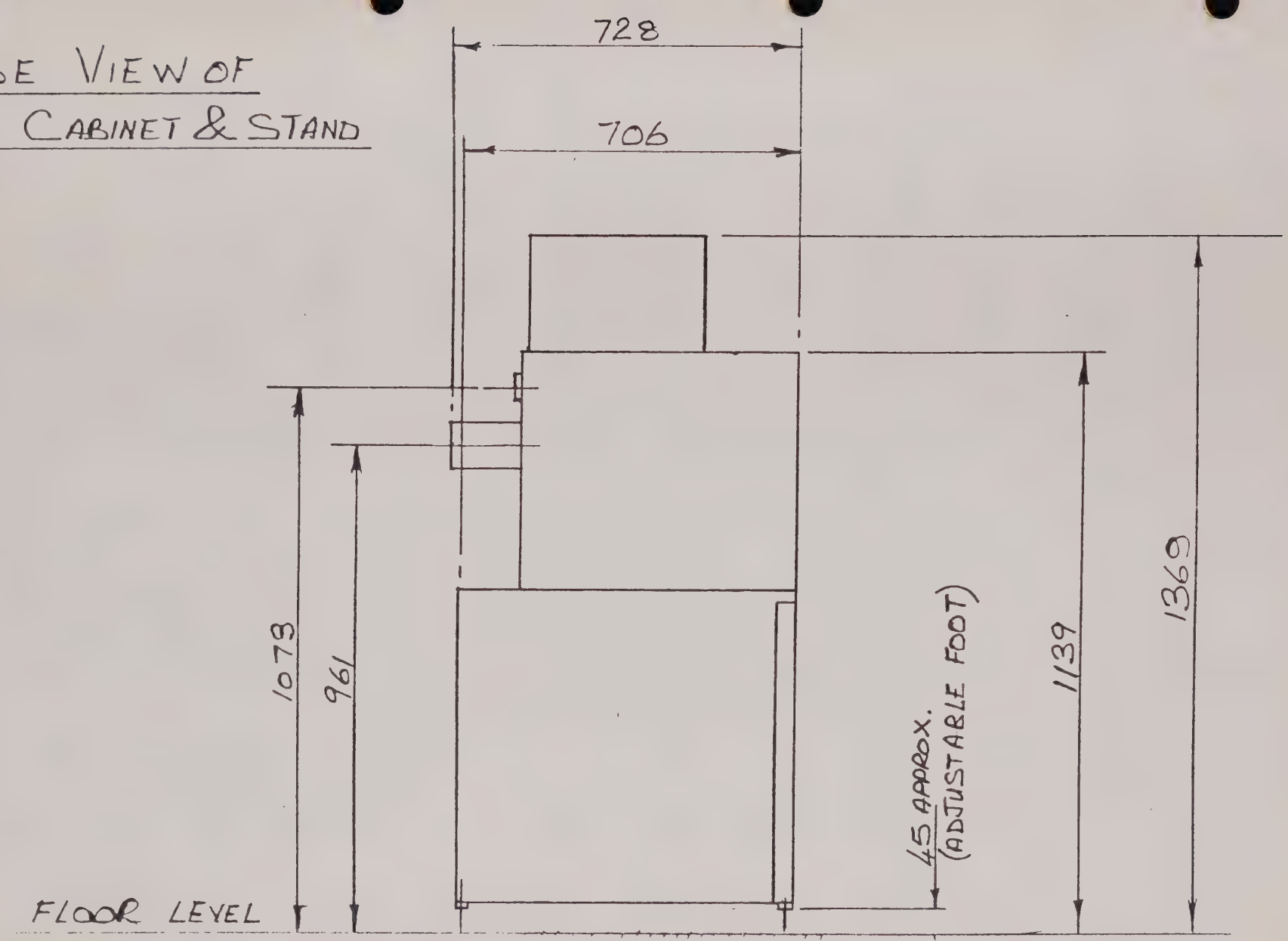
- *Locate the automatic pressure controller connecting lead which is fed through a port to the centre right of the control rack rear services panel and bears an amphenol 13-way connecting plug. Fit it at the 13-way connecting point on the gate valve (situated behind the mainframe assembly cabinet).*

- *Locate the backing pump flexible steel pipe to the upper right hand side of the supporting cabinet rear services panel. Connect it to the appropriate point on the backing pump.*

- Make the flexible steel connection between the pumping outlet point to the rear of the mainframe assembly and the valves to the turbo pump OR rotary vacuum pump as appropriate (consult the manufacturer's manuals in Appendix 1 or a Plasma Technology service engineer if necessary).

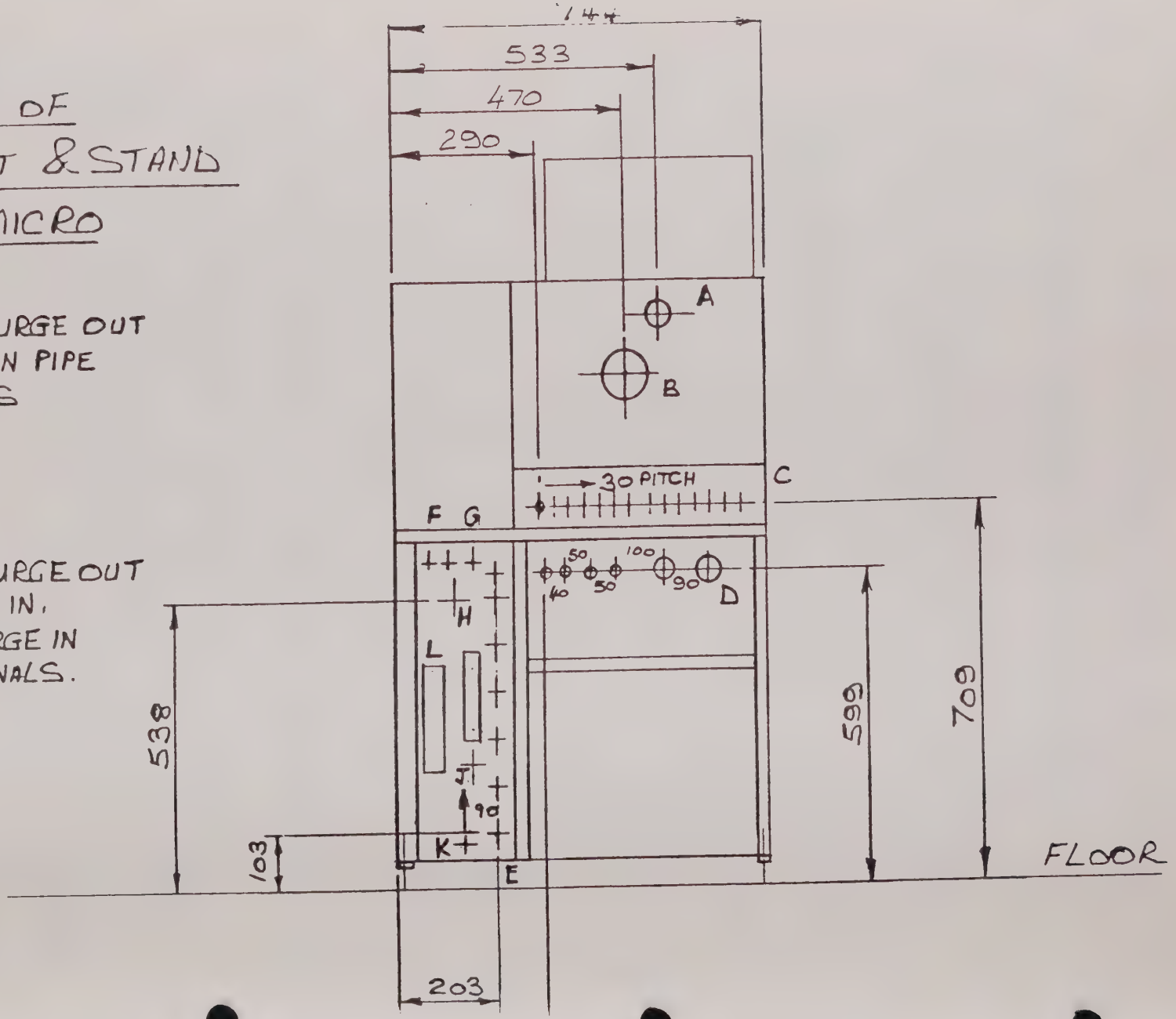
REFER TO THE ILLUSTRATIONS IN SECTION 8.

SIDE VIEW OF MAIN CABINET & STAND



REAR VIEW OF MAIN CABINET & STAND 80 MICRO

A. CABINET PURGE OUT
B. PUMP DOWN PIPE
C. GAS LINES
D. TURBO
E. GAS LINES
F. AIR
G. VENT
H. CABINET PURGE OUT
J. CLEAN GAS IN.
K. CABINET PURGE IN
L. ELEC. SIGNALS.



5.2 INSTALLATION OF THE CONTROL RACK (illustration 5.)

As the control rack and the mainframe and supporting cabinet assembly are interdependant to a large extent some of the connections from the control rack have already been detailed in sub-section 5.1. However, those connections which are specific to the control rack itself are detailed here.

Supply of mains power to the system:

- a single flying lead is required (see mains services in section 3. for precise configuration).

- Locate the power box which is situated to the lower left hand side of the control rack rear services panel.
  Remove the power box contactor cover.

- Locate the electrical contacts within it and wire in the flying lead as follows:

COLOUR CODE	DESIGNATION
black	LIVE
white	neutral
green and yellow	earth

connect LIVE to stud 5

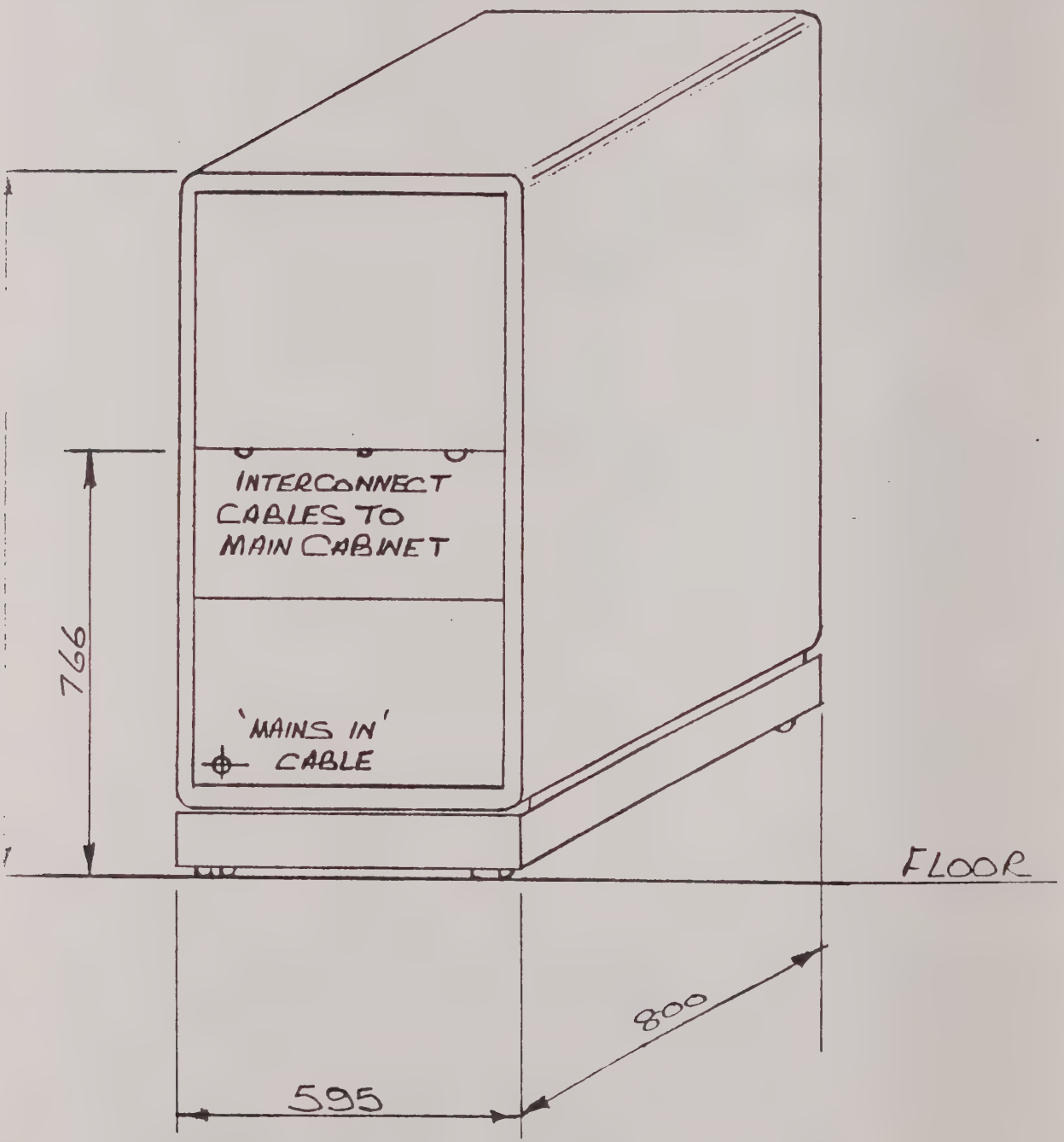
connect neutral to stud 3

connect earth to the earth stud situated to the upper left hand side of the contactor box.

Gas handling system supply connections:

- Locate the loom of up to 7 leads which is fed through a port on the control rack rear services panel. Each lead bears its own amphenol connector. Fit the amphenol plugs at the appropriate connecting points on the gas pod services panel. Each lead, plug and socket is labelled. The gas pod itself is located in its own cabinet to the right hand side of the supporting cabinet (when viewed from the front).

REAR VIEW OF ELECTRONICS CONTROL CABINET



5.3. INSTALLATION OF THE PLANAR CHAMBER ASSEMBLY

Check that the compressed air supply is connected to the mainframe assembly.

Open the high vacuum isolation and throttle valves to ensure that the chamber is not under vacuum.

To move the chamber assembly upwards:

- depress the coloured safety button on the right hand side of the mainframe assembly top-plate
- at the same time, move the hoist control lever (on the left hand side of the mainframe assembly top-plate) to the right.

The chamber assembly should move upwards slowly and firmly.

To move the chamber assembly downwards:

- depress the coloured safety button
- at the same time, move the hoist control lever to the left.

The chamber assembly should move downwards slowly and firmly.

The hoist operating speed can be varied by adjusting the screw restrictor valves. These valves are located underneath the mainframe assembly top-plate, just inside the front of the cabinet.

Remove any packing from the chamber.

If the system is configured for planar etching or plasma deposition, install the segmented glass base-plate shield making sure that the small holes line with the gauge and leak test ports. See sub-section 7.1.m for further details.

If the system is configured for reactive ion etching, the height of the lower electrode is determined by the dark space shield. See sub-section 7.1.i for further information.

If the system is configured for planar etching or plasma deposition it will be necessary to adjust the height of the lower electrode as and when required. For further details refer to the appropriate optional equipment sub-sections.

Ensure that the internal parts of the chamber are clean and dust free. Wash them with a solvent if necessary.

Connect a suitable vacuum pump (see section 7.0) to the main NW 40 or LF 63 pumping flange connection. This protrudes through the rear services

panel of the mainframe assembly.

ELECTRODE CONNECTIONS.

As explained in section 4.3., the planar chamber assembly may be operated in two distinct modes as far as the electrical connection of the electrodes is concerned:

- the planar etch/plasma deposition mode
- the reactive ion etch mode.

In the planar etch/plasma deposition mode, the upper electrode is driven by either an HF or LF generator. The lower electrode is connected to ground. For full details refer to the appropriate optional equipment sub-sections.

In the reactive ion etch mode, the lower electrode is driven by an HF generator operating at 13.56 MH_2 and the upper electrode is grounded for detailed information, refer to the appropriate optional equipment sub-sections.

Sect. 6

REFER TO

PAL 68000

HARDWARE & SOFTWARE

MANUALS

7.1.a WATER-COOLED ALUMINIUM UPPER ELECTRODE (refer to figs. 1)
DESCRIPTION

A water-cooled, aluminium upper electrode is utilised in RIE, planar etch and plasma deposition systems, except upwards plasma deposition systems where an electrode with a substrate carrier and hinge assembly is employed (see sub-section 7.1.e).

INSTALLATION

Read section 2., headed 'Safety', carefully.

(i) REMOVAL AND INSTALLATION OF THE UPPER ELECTRODE

If the system is switched on, vent it according to the micro-controller process status (see page 21, section 6, 'programming in the functions in process 1, step 1, * vent.'). Wait for at least 30 seconds and make sure that the chamber is not under vacuum.

- SWITCH OFF ALL ELECTRICAL POWER TO THE SYSTEM
- Turn off the water supply to the system.
- Unscrew the two metal screws located beneath the black screw caps on the top of the chamber top cover.
- Remove the chamber top cover.
- Unscrew the four large Allen bolts; two on the chamber end adjusting plate (see illustrations 2) and two under the gas inlet pipe on the chamber lift beam.
- Disconnect the VCR fitting to the gas inlet assembly above the chamber lift beam (see illustration 2).

- Disconnect the LHS + RHS copper earth straps at their connecting points on either side of the gas inlet assembly. if the lift beam slot which houses the gas inlet pipe is large enough to allow the gas inlet pipe and VCR fitting to pass through it (see illustration 2).
- Disconnect the LHS + RHS copper earth straps at the two large polypropylene contact shoes.
- Raise the hoist as far as it will go VERY GENTLY.
- Disconnect the two water cooling inlet and outlet fittings (the green tubes) situated to the LHS & RHS of the hoist column (see illustration 3).
- Carefully lift out the whole upper electrode assembly, including the chamber glass, implosion shield and polypropylene insulating blocks. Place the assembly on a work bench.
- The gas inlet will still be attached to the upper electrode. Disconnect it by removing the 4 Allen screws located in the top of the gas inlet assembly.
- Remove the PTFE spacer located directly beneath the gas inlet assembly.
- If the lift beam slot which houses the gas inlet pipe is NOT large enough to allow the gas inet pipe and VCR fitting to pass through it (see illustration 2).
- Remove the 2 main frame assembly rear cover panels by undoing the Phillips screws (see illustration 4).
- Locate the hoist assembly positioned to the right hand side of the main frame cabinet when viewed from the back (see illustration 5).

- Locate the gas inlet SS tube and VCR fitting located to the left hand side of the hoist column (see illustration) (just below the VCR fitting, a yellow tube is connected in which connects with the PURGE GAS IN fitting on the main frame assembly rear services panel).
- Disconnect the VCR fitting on the gas inlet SS tube at the upper part of the gas inlet assembly SS tube above the lift beam.
- Disconnect the blue tube which is attached at the black elbow connector as the Nupro valve - release the tube by pulling it free GENTLY.
- CAREFULLY remove the SS gas inlet tube and Nupro valve assembly by pulling up the portion of the tube which is inserted in the hoist column. Some difficulty may be experienced when the 2 bushes (which are mounted to the top of the hoist column port and partially internally) meet with the SS gas inlet VCR fitting as it moves up the hoist column. It may be necessary to use a little more force to free the bushes.
- Disconnect the 6 Allen bolts at the hoist and at the lift beam.
- Disconnect both the LHS & RHS copper earth straps at the large polypropylene insulating blocks. Remove both contact shoes.
- Disconnect the 2 Allen screws at either side of the gas inlet assembly to either side of the lift beam.
- Disconnect the 2 Allen screws directly beneath the lift beam (the ones bearing the insulating spacers) by using a ball driver through the 2 holes immediately above them in the lift beam (see illustrations 2).

- Lift up the lift beam - the gas inlet assembly will go with it - and place to one side.
- Remove the PTFE spacer from the top of the upper electrode (this was positioned under the gas inlet assembly itself).
- Disconnect the 2 water cooling fittings (green tubes) situated to the RHS & LHS of the hoist column (see illustration 3).
- If the lift beam is still in position, GENTLY raise the hoist.
- CAREFULLY lift the whole upper electrode assembly, including chamber glass and polypropylene insulators over the lower electrode and place on a bench.
- Unscrew the implosion shield attachment screws which fix the implosion shield to 3 of the polypropylene insulating blocks and remove the implosion shield.
- Unscrew the metal chamber strap locating screw (locating into the polypropylene insuating block nearest the hoist column).
- Rotate the glass chamber very carefully until it can be removed.
- Remove the 2 Allen screws in the top of each polypropylene insulating block.

TO INSTALL WATER COOLED UPPER ELECTRODE

The method of installing this electrode depends on whether, on disconnection of the old electrode, the lift beam slot which houses the gas inlet pipe was large enough to allow the gas inlet pipe and VCR fitting to pass though it (see illustration 2).

IF THE SLOT WAS LARGE ENOUGH

- Take the electrode and position the upper electrode circular PTFE spacer over the electrode central gas inlet taking care to match up the holes for the Allen screws.

- Fit the gas inlet assembly to the electrode using the 4 Allen screws (the gas inlet assembly fits directly above and onto the PTFE spacer and the same 4 Allen screws secure both components).
- Fit the 4 polypropylene blocks to the upper electrode, securing them with the 2 screws in the top of each.
- Fit the glass chamber into position very carefully - the lugs on metal chamber straps must be securely located - and rotate it until it clicks home.
- Re-fit and tighten the metal chamber strap locating screw.
- Re-position the implosion shield and screw it to 3 of the polypropylene insulating blocks (the small rectangular cut-out on the bottom edge of the shield lines up with the hoist column).
- Carefully lift the whole assembly over the lower electrode and make sure that the chamber glass is positioned centrally.
- Connect the water inlet and outlet pipes on the electrode to the water inlet and outlet connections at the hoist column.
- Turn on the water supply and check for leaks.
- Lower the hoist very carefully, making sure that the upper electrode assembly is still positioned centrally.
- Replace the metal earth bars which are positioned on the 2 large polypropylene insulating blocks. Make sure that the attachment holes line up.
- Reconnect the LHS & RHS copper earth straps at the 2 large polypropylene blocks, making sure that the earth strap contact connecting points are attached to the shoes as well as the polypropylene block (see illustration 6).

- Reconnect the LHS & RHS copper earth straps at their connecting points on either side of the gas inlet assembly.
- Carefully manoeuvre the gas inlet SS tube and Nupro valve assembly into position (see illustration 2).
- Reconnect the VCR fitting on the gas inlet assembly to the gas inlet SS tube at the connecting point downstream from the Nupro valve (see illustration 2).
- Re-attach the chamber lift beam by replacing the 4 large Allen screws; 2 on the chamber adjusting plate and 2 just under the gas inlet pipe to the hoist end of the chamber lift beam (see illustration 2).
- Replace the chamber top cover.
- Secure it with the 2 screws and replace the black caps which clip on to the white plastic collars on the screw necks.
- Open the chamber fully
- Make sure that all the parts of the chamber are clean, and wash them with a little solvent if necessary.
- Close the chamber.
- Switch on all electrical supplies to the system.
- Check for vacuum leaks.
- Run a plasma to de-gas the system.

IF THE SLOT WAS NOT LARGE ENOUGH

- Fit the 4 polypropylene blocks to the upper electrode, securing them with the 2 Allen screws in the top of each.
- Fit the glass chamber into position very carefully - the lugs on the metal chambers straps must be securely located - and rotate it until it clicks home.

- Re-fit and tighten the metal chamber strap locating screw.
- Re-position the implosion shield and screw it to 3 of the polypropylene insulating blocks (the small rectangular cut-out on the bottom edge of the shield lines up with the hoist column).
- Carefully lift the whole assembly over the lower electrode and make sure that the chamber glass is positioned centrally.
- Connect the RHS & LHS water inlet and outlet pipes (green) at the connecting points on the hoist column.
- Turn on the water supply and check for leaks.
- Replace the metal contact shoes which are positioned on the 2 large polypropylene insulating blocks. Make sure that the attachment holes line up.
- Position the upper electrode circular PTFE spacer over the electrode central gas intake taking care to match up the holes for the Allen screws.
- Take the gas inlet assembly and place the end with the VCR fitting through the oval slot in the lift beam (the VCR fitting MUST face the end of the lift beam with the chamber plate i.e. away from the hoist end, or it will be impossible to make the connection with the gas inlet SS tube later. Make sure that the 2 Allen screws with the insulating spacers are still in the 2 holes in the gas inlet assembly which will be obscured by the lift beam (they will not go in afterwards).
- Reconnect the lift beam to the hoist column by means on the 6 Allen bolts. The middle 2 are short bolts (they must be screwed into the top of the LHS & RHS water connections at the base of the hoist later).

- Reconnect the 2 LHS & RHS copper earth straps , the 2 large polypropylene blocks, making sure that the earth strap connecting points are attached to the contact shoes as well as the polypropylene block (see illustration 6). Make sure that the hole in the contact shoes and the top of the blocks are still in alignment.
- Check for vacuum leaks.
- GENTLY move the hoist down.
- Make sure that the gas inlet assembly and the 2 Allen screws are in alignment with the circular polypropylene spacer and the attachment holes in the top of the upper electrode.
- Make sure the hoist is down as far as it will go, and then tighten gas the inlet assembly Allen screw which is nearest the hoist end, BUT NOT FULLY.
- Apply a little downward pressure to the end of the lift beam, furthest away from the hoist end - this will allow the second gas inlet assembly Allen screw to be secured.
- Tighten both Allen screws.
- Reconnect the copper earth strap to the top of the gas inlet assembly at either side of the lift beam. Use the 2 big Allen screws and place a washer above and below the earth strap. DO NOT SPLIT THE COPPER STRANDS IN THE EARTH STRAP.
- Attach the middle 2 short Allen bolts at the hoist end of the lift beam to the LHS & RHS water inlet and outlet connections. The connections can be moved upwards to meet the Allen bolts.
- Take the gas inlet SS tube and Nupro valve assembly and place the long straight part of the tube with the VCR fitting on the

end back down the appropriate hoist column part via the slot in the lift beam.

- Take the bushes and fit them round the gas inlet SS at the top of the hoist part and insert the bushes into the part as the tube is fitted.
- Replace the 2 long Allen bolts at the chamber adjusting plate (the 2 metal bushes are positioned on the lift beam under the adjusting plate). Tighten the bolts (this will free the VCR fitting).
- Replace the 2 large Allen bolts and washers which secure the chambers lift beam at the hoist end (under the gas inlet SS tube).
- Take the gas inlet assembly VCR fitting and attach it to the equivalent fitting on the gas inlet SS tube downstream from the Nupro valve (see illustration 2).
- In the main frame cabinet at the hoist assembly, locate the male/female VCR fittings on the gas inlet grey pipe, and the gas inlet SS tube which has been installed in the hoist port. Connect them.
- Reconnect the blue compressed air tube to the black elbow fitting on the Nupro valve.
- Replace the 2 main frame assembly rear cover panels by means of the Phillips screws.
- Replace the chamber top cover.
- Secure it with the 2 screws and replace the black caps which clip onto the plastic collars on the screw necks.
- Open the chamber fully.

- Make sure that all parts of the chamber are clean, and wash them with a little solvent if necessary.
- Close the chamber.
- Switch on all electrical supplies to the system.
- Check for vacuum leaks.
- Run a Plasma to de-gas the system.

(ii) ELECTRICAL CONNECTION - UPPER ELECTRODE DRIVEN

It is possible to drive the upper electrode with either HF or LF power and the wiring for both of these modes is described in this sub-section. For details regarding the screening required for HF operation, see sub-section 7.2.a. For details regarding the electrical connections to the lower electrode for HF or LF applications (lower electrode grounded) see sub-section 7.1.g. Information regarding the electrical connections for the RIE mode (lower electrode driven) see sub-section 7.1.i.

These instructions assume that the electrical connections are being made at the same time as the upper electrode is being installed, and for this reason the 'opening up' and 'closing' instructions given above have not been repeated here.

Every system is supplied with RF leads for both HF and LF power. These leads are permanetly situated in the hoist column. THE RF LEAD WHICH IS NOT IN OPERATION MUST ALWAYS BE GROUNDED, TOGETHER WITH THE RESPECTIVE RF GROUND LEAD.

These instructions were prepared when reviewing the machine from the back.

For operation with HF power (refer to 7).

- Take the HF RF lead (the thicker of the two RF leads) passing up the hoist column and connect it to the left hand insulated gas inlet bolt.
- Ensure that the screening of the HF RF lead is strapped to the common ground connection linking the hoist column, gas inlet top-plate and the chamber top cover left hand contact shoe (see illustration 8).
- Take the LF RF lead (the thinner of the 2 RF leads) passing up the hoist column, and ground it at the screw on the top right hand side of the hoist column, together with its screening.

For operation with LF power (refer to fig. 9)

- Take the LF RF lead and connect it to the right hand insulated gas inlet bolt.
- Ensure that the screening of the LF RF lead is peeled back and connected to an earth wire which is then grounded at the right hand insulated gas inlet bolt.
- Take the HF RF lead and ground it at the chamber top cover left hand contact shoe (10).

(iii) ELECTRICAL CONNECTIONS - UPPER ELECTRODE GROUNDS (refer to fig 8)

Ground the LF RF lead and its screening at the screw on the top right hand side of the hoist column.

- Ground the HF RF lead at the chamber top cover left hand contact shoe.
- Make sure that the screening of the HF RF lead is strapped to the common ground connection linking the hoist column gas inlet top-plate and the chamber top cover left hand side contact shoe.

OPERATION

Operate in accordance with section 6.

7.1.b ANODISED ELECTRODES

DESCRIPTION

Anodised electrodes are used in chlorine based processed where natural aluminium would be attacked by the chemical effect of the plasma.

The hard anodised coating used is at least 50 microns thick with a dielectric strength of 1000 M ohms at 500 volts. Under normal operating conditions, it is usually quite resistant to the effects of plasma environments.

However, if intense discharges are allowed to persist while the system is in operation the anodising may break down rapidly.

If this happens, or if a gradual erosion of the anodising is observed over a long period of use, the electrode(s) should be returned to Plasma Technology for stripping and re-anodising.

7.1.c KF25 MONITOR FLANGE AND BLANK

DESCRIPTION

A KF25 monitor flange and blank may be incorporated into a water-cooled upper electrode to accommodate extra fittings i.e. a laser end-point detector head.

If this facility is required after the delivery of the system it will be necessary to order a replacement electrode and fit it on site.

INSTALLATION

See sub-section 7.1.a for full installation details.

OPERATION

Operate in accordance with section 6.

7.1.d AUXILLIARY ELECTRICAL FEED-THROUGH LOCATIONS

DESCRIPTION

A water cooled upper electrode with 2 auxilliary electrical feed-throughs is normally utilised in conjunction with a cathodic grid facility when operating with a D.C. bias. The feed-throughs are used to suspend a stainless steel grid (see sub-section) and a counterpart grid can be added to the lower electrode (see sub-section). The feed-through maximum voltage and current ratings are 500V and 750mA respectively.

Information regarding the D.C. bias power supply required may be found in sub-section

INSTALLATION

Read section 2. headed 'Safety', carefully.

If the auxilliary feed-through locations have not been specified during manufacture of the system it will be necessary to replace the existing upper electrode. For full instructions regarding removal and installation of upper electrodes, see sub-section 7.1.a. For information regarding the installation of the upper and lower electrode stainless steel grid, see sub-sections respectively.

OPERATION

Operate in accordance with section 6 and sub-section

7.1.e UPPER ELECTRODE WITH SUBSTRATE CARRIER AND HINGE ASSEMBLY

DESCRIPTION

This electrode is used exclusively for upwards plasma deposition operations and in conjunction with a special counter lower electrode (see sub-section 7.1.o).

INSTALLATION

Installation of this upper electrode, together with the counter lower electrode, should always be carried out by a Plasma Technology Service Engineer.

OPERATION

Operate in accordance with section 6.1.

7.1.f 240MM DIAMETER WATER COOLED ALUMINIUM LOWER ELECTRODE

DESCRIPTION

A water-cooled aluminium lower electrode may be used for either planer etch or reactive ion etch applications.

In the planer etch mode of operation the lower electrode is grounded and the system may be used with either an HF or LF plasma generator. Grounding of the lower electrode is covered in this sub-section, whilst details regarding the installation of plasma generators, impedance matching units and screening for HF applications may be found in sub-sections .

Information regarding the HF and LF electrical connections to the upper electrode for the planer etch/plasma deposition mode may be found in sub-section 7.1.a.

In the RIE mode the lower electrode is driven whilst the upper is grounded, and it is necessary to fit a RIE kit. This mode of operation is described in sub-section and grounding of the upper electrode is detailed in sub-section 7.1.a.

Read the instructions through before commencing any of the installtion or removal procedures.

INSTALLATION

(i) Removal and installation of the water cooled lower electrode

- If the system is switched on, vent it accordingly to the micro-controller process status (see page 21, section 6 'programming in the functions in Process 1, Step 1 * vent. Wait for at least 30 seconds and make sure that the chamber is not under vacuum.
- SWITCH OFF ALL ELECTRICAL POWER TO THE SYSTEM
- Turn off the water supply to the system.
- Unscrew the 2 metal screws located beneath the black screw caps on the top of the chamber top cover.
- Remove the chamber top cover.
- Unscrew the implosion shield attachment screws which fix the implosion shield to 3 of the polypropylene insulating blocks.
- Unscrew the metal chamber strap locating screw (locating into the polypropylene insulating block nearest the hoist column).
- Fully open the chamber.
- Rotate the glass chamber very carefully until it can be removed.
- Remove the glass chamber and the implosion shield together .
- Remove the 4 screws secruing the main frame assembly front panel and lift it out .

- Remove the 2 main frame assembly rear cover panel by undoing the Phillips screws.

- Disconnect the electrical connection(s) on the lower electrode leg(s). If the HF RF is employed it will be necessary to remove the electrode legs RF screening cans by twisting clockwise and pulling GENTLY downwards.
- Disconnect the water compression fittings from the 2 water cooling legs. If HF RF is employed it will be necessary to remove the electrode leg RF screening cans.
- Undo the threaded feedthrough nut on each of the lower electrode legs (black nuts).
- Remove the backing washer and 'O' ring from each leg.
- Carefully lift the electrode out.

To re-install the water-cooled lower electrode:

- Carefully lower the electrode legs through the feedthrough making sure that the electrode stays horizontal.
- Make sure that the leg tapped for the electrical connection is in the correct position - back right hand side (when viewing the machine from the front).
- Fit the 'O' ring seal, backing washer and plastic nut to each leg.
- Adjust the table height.
- Tighten the plastic NUTS BY HAND ONLY.
- Fit the compression water fittings to the 2 lower electrode legs

NOTE: if a resistance-heated lower electrode has been in use it will be necessary to replace the 2 nylon water inlet and outlet pipes with 2 which bear compression fittings suitable for attachment to the cooling legs of the water-cooled electrode. See sub-section .

- Turn on the water supply and make sure that there are no leaks.
- Connect the RF ground lead to the back right hand side lower electrode leg and ground the lead at the central earth block terminal (part No.). For details of 'HF RF electrode driven' connections for RIE see sub-section .

- Replace the main frame assembly rear cover panels.
- Replace the main frame assembly front panel.
- Check the large upper and lower planar chamber 'O' rings. They must be correctly located and dust-free.
- Place the glass chamber inside the implosion shield and lift them both over the lower electrode.
- Release the implosion shield and lift the glass chamber into position very carefully - the lugs on the metal chamber strap must be securely located - and rotate it until it clicks home.
- Replace and tighten the metal chamber strap locating screws.
- Re-position the implosion shield and screw it to the 3 polypropylene insulating blocks (the small rectangular cut-out on the bottom edge of the shield lines up with the hoist).
- Make sure that the lower electrode, chamber baseplace and 'O' ring are clean by washing them with solvent.

- Close the chamber.
- Replace the chamber top cover.
- Secure it with the 2 screws and replace the black screw caps which clip on to the white plastic collars on the screw necks.
- Switch on all electrical power supplies to the system.
- Check for vacuum leaks.
- Run a plasma to de-gas the electrode.

OPERATION

Operate in acocrdance with section 6.

7.1.g 170MM WATER-COOLED ALUMINIUM LOWER ELECTRODE

DESCRIPTION

a 170mm water-cooled aluminium lower electrode is available as an option to the 240mm lower electrode for either planer etch or reactive ion etch applications.

The smaller surface area, compared with that of a 240mm electrode, produces a high DC bias effect. In all other respects the 170mm electrode is identical to the 240mm version, and therefore details regarding installation and operation are the same. Refer to sub-section 7.1.f for further details.

7.1.h ANODISED ELECTRODES

DESCRIPTION

Anodised electrodes are used in chlorine based processes where natural aluminium would be attacked by the chemical effect of the plasma.

The hard anodised coating used is at least 50 microns thick with a dielectric strength of 1000M ohms at 500 volts. Under normal operating conditions, it is usually quite resistant to the effects of plasma environments.

However, if intense local discharges are allowed to persist while the system is in operation the anodising may break down rapidly. If this happens, or if a gradual erosion of the anodising is observed over a long period of use, the electrode(s) should be returned to Plasma Technology for stripping and re-anodising.

7.1.i REACTIVE ION ETCH KIT FOR 240MM WATER-COOLED LOWER ELECTRODE (refer to 14).

DESCRIPTION

Planar systems can be modified to carry out reactive ion etch procedures by the addition of a RIE kit and some alterations to the electrical connections.

The RIE kit consists of:

- A dark space shield to be fitted beneath the lower electrode.
- A HF RF lead with a special coaxial fitting for the lower electrode HF RF connection.
- Screening cans to be fitted to each of the 4 lower electrode legs.
- Instrument screening can No. 1 for the pressure/flow readout, penning gauge, and the 'clean mode' l.e.d. present on plasma deposition systems.
- Instrument screening can No. 2 for the temperature indicator.
- A large port base-plate swage fitting to receive the DSS earth connection.

A penning gauge, reading pressures to 10-6 torr, is usually employed when operating in the RIE mode. For further information, consult section .

Details regarding the installation of the screening cans for the lower electrode legs may be found in this sub-section. The instrumentation screening cans must be installed by a Plasma Technology Service Engineer.

In the RIE mode, a water-cooled lower electrode is drive by an HF plasma generator whilst the upper electrode is grounded (see sub-section 7.1.a).

NOTE: If a planar system is to be modified for RIE, best results will be obtained if 63mm high conductance pipework and a roots blower are utilised. This will ensure a very high gas flow at low pressures. For further details, see sub-sections respectively.

Instructions for the removal of the dark space shield have been included at the end of this sub-section, following the installation and operation instructions, should it be necessary to convert the system to the planer modes of operation.

Read the instruction through before commencing any of the installation procedures.

INSTALLATION

Read section 2, headed 'Safety' carefully.

(i) FITTING THE RIE KIT (refer to illustration 14).

The following instructions assume that a water-cooled aluminium lower electrode is fitted. When fitting the water-cooled lower electrode consult section 7.1.f. If possible it is preferable to

combine the fitting of the RIE kit with the installation of the water cooled lower electrode.

- If the system is switched on, vent it accordingly to the micro-controller process status (see page 21, section 6 'Programming in the functions in Process 1, Step 1 * vent'. Wait for at least 30 seconds and make sure that the chamber is not under vacuum.
- SWITCH OFF ALL ELECTRICAL POWER TO THE SYSTEM
- Turn off the water supply to the system.
- Unscrew the 2 metal screws located beneath the black screw caps on the top of the chamber top cover.
- Remove the chamber top cover.
- Unscrew the implosion shield attachment screws which fix the implosion shield to 3 of the polypropylene insulating blocks.
- Unscrew the metal chamber strap locating screw (locating into the polypropylene insulating block nearest the hoist column).
- Fully open the chamber.
- Rotate the glass chamber very carefully until it can be removed.
- Remove the glass chamber and the implosion shield together.
- Remove the 4 screws securing the main frame assembly front panel and lift it out.
- Remove the 2 main frame assembly rear cover panels by undoing the Phillips screws.

- Disconnect the RF ground lead from the back right hand electrode leg.
- If converting from a planer etch system:

Undo the swagelock blank on the earth stud housing (situated between the back right hand and front right hand legs on the underside of the mainframe assembly).

- If converting from a plasma deposition system:
  Remove the right hand base-plate feedthrough connection (see sub-section 7.1.k) as the port is too small to house the earth stud. Fit the baseplate feedthrough connection supplied with the RIE kit instead as this has a port suitable for the earth stud.
- Position the earth stud in the port, but do not tigthen it up.
- Undo the black plastic, threaded feedthrough nut on each electrode leg.
- Remove the backing washer and 'O' ring from each leg.
- Darkspace shield: fit the insulating spacer inside the top of the darkspace shield to line up with the 4 large holes, and make sure that the outer edge of the spacer is located right at the top, inside the circumference of the shield.
- Lift up the lower electrode and slide the dark space shield into position under the electrode legs.
- Raise the dark space shield up the electrode legs and push into position around the lower electrode ensuring that the connection for the earth stud is correctly lined up.
- Carefully lower the electrode legs back through the feedthroughs, making sure that the electrode stays horizontal.
- Make sure that the leg tapped for the electrical connection is in the correct feedthrough - back right hand.
- Make sure that the dark space shield is flush with the insulating blocks and the chamber baseplate.

- Re-fit the 'O' ring, backing washer and black plastic nut to each leg.
- Tighten the black plastic nuts BY HAND ONLY.
- Screw the earth stud securely into the base of the dark space shield.
- Fit the swage connector in position around the earth stud and secure it.
- Connect the electrical connections to the back right hand leg (see changing the electrical wiring for RIE operation further on in this sub-section).
- Re-connect the compression fittings from the 2 water cooling legs.
- Turn on the water supply and make sure that there are no leaks.
- Fit the 4 screening cans over the electrode legs - push fully up and then half turn (left or right).

- Replace the mainframe assembly rear cover panels.
- Replace the mainframe assembly front panels.
- Check the large upper and lower planar chamber 'O' rings. They must be correctly located and dust free.
- Place the glass chamber inside the implosion shield and lift them both over the lower electrode.
- Release the implosion shield and lift the glass chamber into position very carefully - the lugs on the metal chamber strap must be securely located - and rotate it until it clicks home.
- Replace and tigthen the metal chamber strap locating screws.

- Re-position the implosion shield and screw it to the 3 polypropylene insulating blocks (the small rectangular cut-out on the bottom edge of the shield lines up with the hoist).
- Make sure that the lower electrode, chamber baseplate and 'O' ring are clean by washing them with solvent.
- Close the chamber.
- Replace the chamber top cover.
- Secure it with the 2 screws and replace the black screw caps which clip on to the white plastic collars on the screw necks.
- Switch on all electrical power supplied to the system.
- Check for vacuum leaks.
- Run a plasma to de-gas the system.

(ii) ELECTRICAL CONNECTIONS - LOWER ELECTRODE DRIVEN (RIE MODE) (refer to illustration 15).

These instructions assume that an HF plasma generator and HF impedance matching unit are already installed, and that this re-wiring is being undertaken at the same time as the lower electrode/RIE kit installation. For this reason, the 'opening up' and 'closing' instructions in (i) have not been repeated here.

Every system is supplied with leads for both HF power and LF power when the upper electrode is to be driven. These leads are situated in the hoist column, and must both be correctly grounded when changing to the lower electrode drive mode. For full details, see sub-section 7.1.a.

MAKE SURE THAT ALL ELECTRICAL POWER TO THE SYSTEM IS SWITCHED OFF

IF AN AUTOMATIC IMPEDANCE MATCHING UNIT IS NOT FITTED, FOLLOW THESE INSTRUCTIONS:-

These instructions were prepared when viewing the machine from the back.

- Remove the back panel from the small extension cabinet, on the left hand side of the mainframe assembly, which houses the impedance matching unit.
- If HF power has been used previously, disconnect the HF RF lead from the lower capacitor and withdraw it from the HF matching unit cabinet into the mainframe assembly via the gland (part).
- Ground the HF RF lead at the central earth terminal (part) in the mainframe cabinet.
- Remove the RF ground lead connected between the left hand lower electrode leg (looking from the back) and the central earth terminal.
- Take the short HF RF lead with the special coaxial connector (supplied with the RIE kit) and feed the end with the screw connection through the gland to the HF matching unit.
- Connect the special coaxial connection to the left hand lower electrode leg and tighten it on both sides using an Allen key (for details regarding the fitting of screening cans to the lower electrode legs see (i) above.
- Replace the small extension cabinet back panel.

IF AN AUTOMATIC IMPEDANCE MATCHING UNIT IS FITTED, FOLLOW THESE INSTRUCTIONS

These instructions were prepared when viewing the machine from the back.

- Remove the back panel from the small extension cabinet, on the left hand side of the mainframe assembly, which houses the automatic impedance matching unit.
- Remove the side panel from the small extension cabinet.
- Remove the matching unit side panel which bears 6 Allen screws.
- If HF power has been used previously but not for RIE purposes, disconnect the HF RF lead at its connecting point in the small extension cabinet to the LH side of the automatic matching unit (see illustration 11). This may be located by following the HF RF lead from the hoist column (in the case of the system being previously upper electrode drive) through the port between the mainframe assembly cabinet and the small extension cabinet, and across the top of the automatic matching unit.
- Withdraw the HF RF lead into the mainframe assembly cabinet via the port and,
- Ground the HF RF lead at the central earth terminal (illustration 8).
- Remove the RF ground lead connected between the left hand lower electrode leg (looking from the back) and the central; earth terminal.
- Take the short HF RF lead (supplied with the RIE kit) and feed the end with the screw connection through the part into the small extension cabinet.
- Feed the screw connection through the small port in the top of the automatic impedance matching unit assembly.

- Connect the HF RF lead to the lower connecting point (see illustration 11).
- Take the other end of the HF RF lead and connect it to the LHS lower electrode leg (when viewing the machine from the back) by means of the special coaxial connection.
- Tighten it on both sides using an Allen key (for details regarding the fitting of screening cans to the lower electrode legs see (i) above.
- Replace the matching unit side panel bearing the 6 Allen screws.
- Replace the back panel on the small extension cabinet.

OPERATION

Operate in accordance with section 6 and refer to sub-sections 7.2 a and 7.2 b regarding HF plasma generators and HF impedance matching units.

(iii) RETURNING THE SYSTEM TO THE PLANAR MODE BY REMOVAL OF THE DARK SPACE SHIELD

It may be necessary to change the mode of operation from the RIE mode of operation to the planer etch or plasma deposition mode at some point in time.

Depending on the system being converted to, this can involve:-

- Removal of the dark space shield.
- Changing the wiring from lower electrode driven to upper electrode driven.
- Disconnecting the HF plasma generator and HF matching unit if LF plasma generator and LF matching unit are to be used.
- Making the correct connections if an LF plasma generator and LF matchiung unit are to be employed.

- Removing the water cooled lower electrode and replacing it with either a resistance-heated lower electrode if a plasma deposition system is to be used, or possibly a different size of water cooled electrode.
  Dark space shield removal and alterations to the lower electrode electrical connections are covered in this sub-section.

Details regarding the HF plasma generator and HF matching unit may be found in section 7.2.a and 7.2.b respectively, and the electrical wiring for operation with HF or LF generators, upper electrode driven, may be found in sub-section 7.1.a.

Details regarding the LF plasma generator and LF impedance matching unit may be found in sections 7.2.c and 7.2.d respectively.

Information regarding the removal of a water-cooled lower electrode complete with dark space shield is detailed in this sub-section. For installation of a resistance-heated lower electrode, or a different size of water-cooled electrode, consult sub-sections 7.1.k and 7.1.f respectively.

A. REMOVAL OF THE DARK SPACE SHIELD/REMOVAL OF THE DARK SPACE SHIELD AND LOWER ELECTRODE TOGETHER (refer to illustration 14).
NOTE: It is not necessary to remove the rest of the RIE kit when another mode of operation is to be employed.

The dark space shield is removed thus -

- If the system is switched on, vent it according to the micro controllerr process status (see page 21, section 6, 'Programming in the functions in Process 1, Step 1 * vent'. Wait for at least 30 seconds and make sure that the chamber is not under vacuum.
- SWITCH OFF ALL ELECTRICAL POWER TO THE SYSTEM
- Turn off the water supply to the system.
- Unscrew the 2 metal screws located beneath the black screw caps on the top of the chamber top cover.
- Remove the chamber top cover.
- Unscrew the implosion shield attachment screws which fix the implosion shield to 3 of the polypropylene insulating blocks.
- Unscrew the metal chamber strap locating screw (locating into the polypropylene insulating block nearest the hoist column).
- Fully open the chamber.
- Rotate the glass chamber very carefully until it can be removed.
- Remove the glass chamber and the implosion shield together.
- Remove the 4 screws securing the mainframe assembly front panel and lift it out.
- Remove the 2 mainframe assembly rear cover panels by undoing the Phillips screws.

- Slide back the 4 screening cans from the lower electrode legs (twist them clockwise for half a turn and then gently slide them downwards).
- Turn off the water supply to the system.

- Disconnect the compression fittings from the 2 water cooling legs.
- Collect any residual water in the electrode or the fittings in a small container - KEEP THE CABINET DRY.
- Disconnect the RF connection from the back right hand electrode leg.
- Undo the swage connection housing the earth stud (located between the back right hand and front right hand legs on the underside of the mainframe assembly top-plate).
- Remove the earth stud.

  NOTE: IF THE SYSTEM HAS AN INVERTED VENT GAS INLET ASSEMBLY (can be identified by its gas inlet SS tube Nupro valve assembly immediately under the chamber hood) FOLLOW THESE INSTRUCTIONS.
- If a plasma deposition system is to be installed, fit a swagelot blank over the earth stud port, instead of the swagelok (a vacuum switch will already be fitted to a T junction leading to the left hand side port).
- If a planar etch system is to be installed, fit a swagelok blank over the earth stud port, instead of the swagelok (a vacuum switch will already be fitted to a T junction leading to the left hand side port. Note that a vacuum switch is not required on systems without the inverted gas inlet assembly).

  IF THE SYSTEM DOES <u>NOT</u> HAVE AN INVERTED VENT GAS INLET ASSEMBLY (can be identified by the absence of a Nupro valve in the gas inlet SS tube assembly immediately under the chamber hood) FOLLOW THESE INSTRUCTIONS.

- If a plasma deposition system is to be installed; remove the whole baseplate feedthrough connection as the port is too large for the installation of the vacuum switch needed on a plasma deposition system (see sub-section 7.1.k). Replace it with the baseplate feedthrough connection bearing a smaller port which is supplied with a resistance-heated lower electrode.
- If a planar etch system is to be installed; fit a swagelok blank, instead of the swagelok, over the earth stud port. Note that with this type of gas inlet configuration a vacuum switch is not required on planar systems.

- Undo the 4 black plastic, threaded feedthrough nuts on the electrode legs.
- Remove the backing washed and 'O' ring from each.
- Lift up the electrode carefully, push down the dark space shield and remove it from under the legs.

  NOTE: At this point a different type of electrode may be installed. The following instructions describe the replacement of the water-cooled electrode with its HF screening. For details regarding a resistance-heated electrode see section 7.1.k.
- Carefully lower the electrode into the base-late holes, making sure that it stays horizontal.
- Make sure that leg tapped for the electrical connection is in the correct position - back right hand.
- Fit the 'O' ring seal, backing washer and black plastic nut to each leg.

- Adjust the table height.
- Tighten the black plastic nuts BY HAND ONLY.
- Fit the compression water fittings to the lower electrode legs.
- Turn on the water supply and make sure that there are no leaks.
- Connect a RF ground lead to the back right hand leg, and connect it to the central earth terminal (for further details on converting the wiring to the upper electrode driven mode see sub-section 7.1.)
- Re-fit the 4 screening cans up over the electrode legs.
- Replace the mainframe assembly rear cover panels.
- Replace the mainframe assembly front panel.
- Check the large upper and lower planar chamber 'O' rings. They must be correctly located and dust-free.
- Place the glass chamber inside the implosion shield and lift them both over the lower electrode.
- Release the implosion shield and lift the glass chamber into position very carefully - the lugs on the metal chamber strap must be securely located - and rotate it until it clicks home.
- Replace and tighten the metal chamber strap locating screws.
- Re-position the implosion shield and screw it to the 3 poly-propylene insulating blocks (the small rectangular cut-out on the bottom edge of the shield lines up with the hoist).
- Make sure that the lower electrode, chamber baseplate and 'O' ring are clean by washing them with solvent.
- Close the chamber.
- Secure it with the 2 screws and replace the black screw caps which clip on to the white plastic collars on the screw necks.

- Switch on all electrical power supplies to the system.
- Check for vacuum leaks.
- Run a plasma to de-gas the system.

B. REMOVAL OF THE RIE MODE ELECTRICAL WIRING - LOWER ELECTRODE

It is assumed that this wiring is being re-configured at the same time as the lower electrode/dark space shield is being removed. For this reason, the 'opening up' and 'closing' instructions have not been repeated here. These instructions were prepared when viewing the machine from the back (refer to fig.).

MAKE SURE THAT ALL ELECTRICAL POWER TO THE SYSTEM IS SWITCHED OFF

IF ANY AUTOMATIC IMPEDANCE MATCHING UNIT IS NOT FITTED, FOLLOW THESE INSTRUCTIONS:-

- Remove the back extension cabinet panel on the left hand side of mainframe assembly which houses the impedance matching unit.
- Disconnect the HF RF lead from the lower capacitor.
- Disconnect the other end of the HF RF lead at the special coaxial connection on the left hand electrode leg. An Allen key will be required.
- Remove the HF RF lead from the cabinets.
- Take a RF ground lead and connect it to the left hand electrode leg.
- Ground the RF ground lead at the central earth terminal in the mainframe assembly.
- Replace the small extension cabinet back panel.

For details of the wiring for HF or LF plasma generator operation, see sub-sections 7.2.b and 7.2.d connections to the upper electrode for either HF or LF operation are detailed in sub-section 7.1.a.

IF AN AUTOMATIC IMPEDANCE MATCHING UNIT IS FITTED, FOLLOW THESE INSTRUCTIONS:-

These instructions were prepared when viewing the machine from the back.

- Remove the back panel from the small extension cabinet, on the left hand side of the mainframe assembly, which houses the automatic impedance matching unit.
- Remove the side panel from the small extension cabinet.
- Remove the match unit side panel which bears the 6 Allen screws.
- Remove the screening can on the left hand lower electrode leg.
- Disconnect the HF RF lead on the left hand lower electrode leg at the special coaxial fitting using an Allen key.
- At the HF RF connecting point is the automatic impedance matching unit.
- Disconnect the HF RF lead screw connection (see illustration).
- Remove the HF RF lead from the cabinets.
- Take a RF ground lead and connect it to the left hand lower electrode leg.
- Ground the RF ground lead at the central earth terminal in the mainframe assembly (see illustration 12).

IF THE SYSTEM IS TO BE RUN WITH THE UPPER ELECTRODE DRIVEN:-

- Take the long HF RF lead supplied with the deposition or planar mode kit.

- Feed the end with the screw connection through the port into the small extension cabinet.
- Feed the screw connection through the small part of the top of the automtic impedance matching unit assembly.
- Connect the HF RF screw connection at the lower connecting point (see illustration 11).
- Take the other end of the HF RF lead and feed it up to the upper electrode in the left hand hoist port.

FOR UPPER ELECTRODE WIRING INSTRUCTIONS REFER TO SUB-SECTION 7.1.A

OPERATION

Operate in accordance with Section 6 and refer to sub-section 7.2.a and 7.2.b regarding HF plasma generators and HF impedance matching units.

7.1.j RIE KIT FOR 170MM ELECTRODE

DESCRIPTION

An RIE kit is available for use with a 170mm water-cooled lower electrode (see sub-section 7.1.g).

The installation and operation instructions are identical to those for the 240mm RIE kit, and reference should be made to sub-section 7.1.f for further instructions.

7.1.k RESISTANCE-HEATED LOWER ELECTRODE WITH TEMPERATURE CONTROL TO 400^{o}C (refer to figs 16).

DESCRIPTION

This type of lower electrode is used with plasma deposition systems.

It differs from the other types of lower electrods in that the 'table' area may be heated to temperatures up to 400°C, and 2 of the legs are wider than usual to accommodate the heater input and output.

The 'kit' supplied with a resistance-heated lower electrode is as follows:-

- A swage 'T' fitting for the right hand base-plate gauge port with a port for a vacuum switch fitting (for systems where an inverted gas inlet assembly is NOT fitted).
- A swage blank fitting for the right hand baseplate gauge port (for systems where an inverted gas inlet assembly IS fitted).
- A vacuum switch (for systems where an inverted gas inlet assembly is NOT fitted).
- A set of 4 inter-connecting cooling clamps for the electrode legs.
- 2 nylon water cooling tubes with the correct compression fittings for the cooling clamps.
- A heater power supply unit.
- A temperature controller.
- A thermocouple.
- 2 large feedthroughs.

The installaation of all these items is described in this sub-section.

NOTE: If conversion from an existing planar etch or reactive ion etch configuration to a deposition system is required it is strongly recommended that the cabinet is nitrogen purged when operating in the plasma deposition mode. This should be

discussed with a Plasma Technology Service Engineer prior to any installation work. A nitrogen glove box load lock is also recommended - see sub-section 7.1.v for further details.

In the plasma deposition mode the lower electrode is grounded whilst the upper electrode is driven, and it is possible to use either a HF or LF plasma generator depending upon the precise application.

For details of the electrical wiring for the lower electrode grounded, upper electrode driven mode of operation, for either HF or LF applications, consult sub-sections 7.1.a, 7.2.b, and 7.2.d. For information regarding HF and LF plasma generators and their respective impedance matching units, see sub-sections 7.2.a, 7.2.b, 7,2.c and 7.2.d.

Read the instructions through before commencing any installation or dismantling procedures.

INSTALLATION

Read section 2, headed 'Safety' carefully.

(i) REMOVAL AND INSTALLATION OF THE RESISTANCE-HEATED LOWER ELECTRODE

MAKE SURE THAT THE LOWER ELECTRODE IS COLD

- If the system is switched on, vent it according to the micro-controller process status (see page 21, section 6, 'Programming in the functions in Process 1, Step 1 * vent'. Wait for at least 30 seconds and make sure that the chamber is not under vacuum.

SWITCH OFF ALL ELECTRICAL POWER TO THE SYSTEM

- Turn off the water supply to the system.

- Unscrew the 2 metal screws located beneath the black screw caps on the top of the chamber top cover.
- Remove the chamber top cover.
- Unscrew the implosion shield attachment screws which fix the implosion shield to 3 of the polypropylene insulating blocks.
- Unscrew the metal chamber strap locating screw (locating into the polypropylene insulating block nearest the hoist column).
- Fully open the chamber.
- Rotate the glass chamber very carefully until it can be removed.
- Remove the glass chamber and the implosion shield together.
- Remove the 4 screws securing the mainframe assembly front panel and lift it out.
- Remove the 2 mainframe assembly rear cover panels by undoing the Phillips screws.

- At the mainframe assembly rear services panel, disconnect the lead labelled SKT 64 (this is the lower electrode heater supply from the control rack, see illustration 13).
- Disconnect the heater connections on the back left hand side and front right hand side legs of the lower electrode.
- Tie back both leads to the side of the mainframe assembly cabinet and electrically isolate the ends.
- Disconnect the RF ground lead on the back right hand side leg.
- If any other ground leads are connected to the cooling clamps on the electrode legs, disconnect them.
- Disconnect the water compression fittings made to the cooling

clamp circuit inlet and outlet points.

- Collect any residual water in a small container. KEEP THE CABINET DRY.
- Disconnect the table coolant INLET and OUTLET fittings on the mainframe assembly rear services panel.
- Remove the 2 nylon water cooling tubes from the cabinet.
- Replace them with 2 nylon water cooling tubes which bear the correct compression fittings for connection to the legs of a water cooled lower electrode.
- Connect the 2 new tubes at the table coolant INLET and OUTLET fittings on the mainframe assembly rear services panel.

IF AN INVERTED GAS INLET ASSEMBLY IS NOT FITTED (no Nupro valve in the gas inlet SS tube assembly) FOLLOW THESE INSTRUCTIONS:-

- Remove the vacuum switch assembly installed in the right hand side baseplate feedthrough port by undoing the swagelock connection (situated on the underside of the baseplate, between the back right hand and front right hand electrode legs. This is the feedthrough used as an earth stud connection on RIE systems.
- Remove the top cover from the vacuum switch itself by undoing the screws on either side of the name-plate.
- Inside the switch, disconnect the 2 black wires which lead from the switch to the loom on the top right hand inside wall of the cabinet.
- Connect the 2 black wires to one another and insulate the connection well.
- Remove the vacuum switch from the cabinet and re-fit the switch cover.

- If the system is being converted to the planar etch mode; fit a swagelock blank over the right hand side baseplate feedthrough connection.
- If the system is being converted to the RIE mode; remove the entire right hand baseplate feedthrough connection and replace it with the baseplate feedthrough connection with a larger port which is supplied with the RIE kit - see sub-section 7.1.i for further details and refer to illustrations .

  IF AN INVERTED GAS INLET ASSEMBLY IS FITTED (there will be a Nupro valve in the gas inlet SS tube assembly) FOLLOW THESE INSTRUCTIONS
- Do not touch the vacuum switch assembly installation. The switch is 'T' fitted into the left hand baseplate feedthrough and must be left intact at all times.
- If the system is being converted to the planar etch mode; the swagelock blank fitted to the right hand baseplate feedthrough must be left intact.
- If the system is being converted to the RIE mode; remove the entire baseplate feedthrough connection and replace it with the baseplate feedthrough connection which bears a large port to carry an earth stud, both of which are supplied with the RIE kit
- see sub-section 7.1.i for further details and refer to illustrations .
- Unplug the connection to the thermocouple in the front left hand leg. Gently remove the thermocouple from inside the leg. The thermocouple may be left inside the cabinet if required.

- Slacken the cooling clamp bolts (the interconnection between the cooling clamps themselves may be left intact).
- Remove the cooling clamps from the electrode legs.
- Undo the 4 black plastic, threaded feedthrough nuts on the electrode legs.
- Remove the backing washer and 'O' ring from each.
- Lift up and remove the electrode gently, taking care not to scratch the aluminium and copper on the back left hand and front hand legs.
- Carefully remove the brass feedthrough nut, backing washer and main seal 'O' ring on the back left hand and front right hand feedthroughs.
- Remove the 2 feedthroughs - they accommodated the thick heater legs on the electrode and therefore need to be replaced when changing over electrodes.
- Check that the main 'O' ring seals and the 2 new, standard-size feedthroughs are clean.
- Place the main 'O' ring seals on the 2 feedthroughs, and place the feedthroughs in position in the chamber baseplate.
- Replace the washer and brass feedthrough nut on the 2 legs. Tighten them very carefully.

TO RE-INSTALL THE RESISTANCE-HEATED LOWER ELECTRODE:

If small chamber baseplate feedthroughs are in situ:

- Carefully remove the brass feedthrough nut, backing washer and main seal 'O' ring on the back left hand side and front right hand side feedthroughs.

- Attach the 2 wires to the terminal inside the vacuum switch thus; 1 wire to the 'C' terminal (centre), 1 wire to the 'H' terminal (right hand side). The terminals are marked 'C' and 'H' and it does not matter which way round the wires are connected.
- Re-fit the cover to the vacuum switch.
- Take the stainless steel pipe which eminates from the centre of the vacuum switch and connect it to the right hand baseplate feedthrough connection by means of the swage 'T' fitting.
  IF AN INVERTED GAS INLET ASSEMBLY IS FITTED (no Nupro valve in the gas inlet SS tube assembly). A VACUUM SWITCH WILL ALREADY BE FITTED TO THE BACK LHS ELECTRODE LEG VIA A 'T' FITTING. FOLLOW THESE INSTRUCTIONS.
- If the system has been operating in the RIE mode: remove the earth stud situated in the right hand baseplate feedthrough connection (situated on the underside of the baseplate between the back right hand and front right hand electrode legs).
- Replace the earth stud with the swagelock blank in the RIE kit.
- If the system has been operating in the planar mode: there will already be a swagelock blank in situ in the right hand baseplate feedthrough and this assembly should not be touched.
- Disconnect the table coolant INLET and OUTLET fittings on the mainframe assembly rear services panel.
- Remove the 2 nylon water cooling tubes from the cabinet.
  NOTE: That when a temperature indicator is installed, 1 of the water pipes will connect to a brass fitting on the back right hand side cabinet wall. Remove the pipes (in and out) and leave the brass fitting in situ.

- Plug in the connection to the thermocouple from the temperature controller (for installation of the temperature controller and its heater power supply unit, see installation (ii)).

  IF AN INVERTED GAS INLET ASSEMBLY IS NOT FITTED (no Nupro valve in the gas inlet SS tube assembly, a vacuum switch assembly must be incorporated) FOLLOW THESE INSTRUCTIONS:
- If the system has been operating in the RIE mode: remove the earth bolt situated in the right hand side baseplate feedthrough connection (situated on the underside of the baseplate between the back right hand and front right hand legs). Remove the entire baseplate feedthrough connection itself as the port is too large to correctly house the vacuum switch swagelock connection. Replace it with the swage 'T' fitting of the correct port size supplied with the resistance-heated electrode.
- If the system has been operating in the planar etch mode, remove the swagelock blank from the right hand side baseplate feedthrough connection. If the system was originally commissioned as planar etcher, the port will be of the correct size. If not, check it and replace it if necessary (part).
- Remove the top cover from the vacuum switch by undoing the screws on either side of the name-plate.
- Locate the 2 long, black wires which originate at the loom on the top right hand inside wall of the cabinet.
- Locate the insulation which joins these two wires together and remove it. Separate the wires.
- Feed the wires into the vacuum switch through the large black port on the side.

- Remove the 2 feedthroughs - they accommodated standard-size legs on the water-cooled electrode and therefore need to be exchanged for 2 large feedthroughs which will accommodate the 2 thick heater legs on the resistance-heated lower electrode.
- Check that the main 'O' ring seals and the 2 new, large feedthroughs are clean.
- Place the main 'O' rings seals on the feedthroughs, and place the feedthroughs in position.
- Replace the washer and brass feedthrough nut on each of the 2 feedthroughs. Tighten them very carefully.
- Gently lower the resistance-heated lower electrode through the feedthroughs, taking care not to scratch the aluminium and copper on the back left hand and front right hand heater legs.
- Make sure that the leg tapped for the electrical connection is placed in the correct position (back right hand side).
- Fit the 'O' ring seal, backing washer and black plastic nut to each electrode leg, and adjust the height of the lower electrode.
- Tighten the black plastic nuts BY HAND ONLY.
- Position the interconnecting cooling clamps at the bottom of all 4 electrode legs.
- Slide them up to the top of the electrode legs.
- Tighten the cooling clamp bolts.
- Install the thermocouple inside the front left hand side leg carefully, making sure that the thermocouple goes as far up the leg as possible. Very little of the thermocouple should be protruding.
- Bend the probe just enough to retain it in the leg.

- Replace them with the 2 nylon water cooling tubes which bear the correct compression fittings for connection to the cooling clamp circuit.
- Connect the 2 tubes at the table coolant INLET and OUTLET fittings on the mainframe assembly rear services panel.
- Connect the rear compression fittings on the 2 water cooling tubes to the cooling clamp circuit inlet and outlet points. Turn on the water supply and check for leaks.
- Connect the RF ground lead on the back right hand leg (see figs. 17).
- It may be necessary to connect a ground lead to 1 or more of the cooling clamps on the other electrode legs - discuss this with a Plasma Technology Service Engineer.
- Connect the heater connections from the heater power supply unit to the back left hand and front right hand legs of the electrode (for installation of the heater power supply unit and the temperature controller, see INSTALLATION (ii) further on in this sub-section).

- Replace the mainframe assembly rear cover panels.
- Replace the mainframe assembly front panel.
- Check the large upper and lower planar chamber 'O' rings. They must be correctly located and dust free.
- Place the glass chamber inside the implosion shield and lift them both over the lower electrode.

- Release the implosion shield and lift the glass chamber into position very carefully - the lugs on the metal chamber strap must be securely located - and rotate it until it clicks home.
- Replace and tighten the metal chamber strap locating screws.
- Re-position the implosion shield and screw it to the 3 polypropylene insulating blocks (the small rectangular cut-out on the bottom edge of the shield lines up with the hoist).
- Make sure that the lower electrode, chamber baseplate and 'O' ring are clean by washing them with solvent.
- Close the chamber.
- Replace the chamber top cover.
- Secure it with the 2 screws and replace the black screw caps which clip on to the white plastic collars on the screw necks.
- Switch on all electrical power supplies to the system.
- Check for vacuum leaks.
- Run a plasma to de-gas the system.

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SECTION 8.

ILLUSTRATIONS AND MACHINE DIMENSIONS

ILLUSTRATION 1. The Plasmalab μP master unit and control rack.

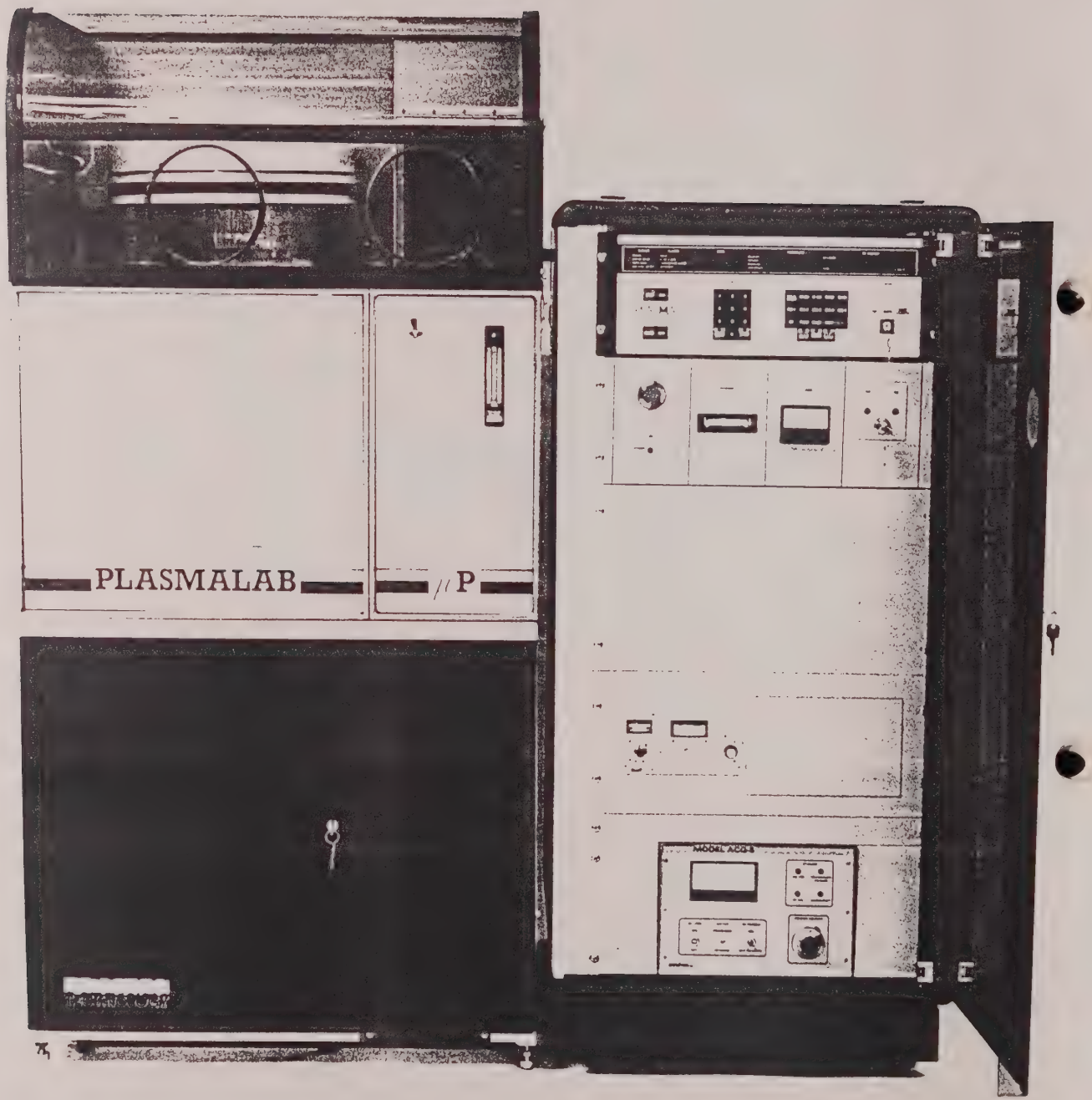


ILLUSTRATION 2. The mainframe assembly rear bulkhead fittings.
(Refer to section 4.1.)

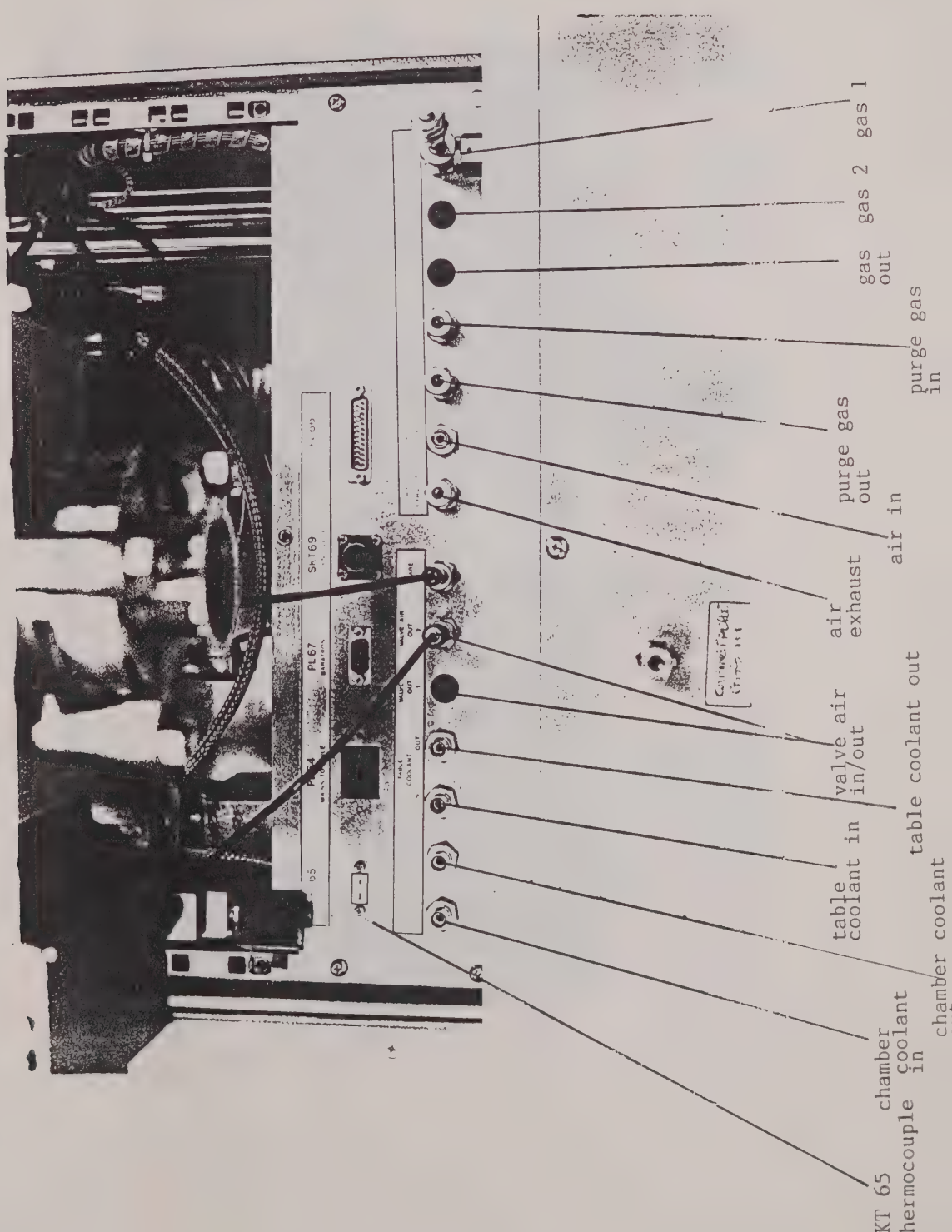


ILLUSTRATION 3. The control rack rear fittings (refer to l
section 4.2.)

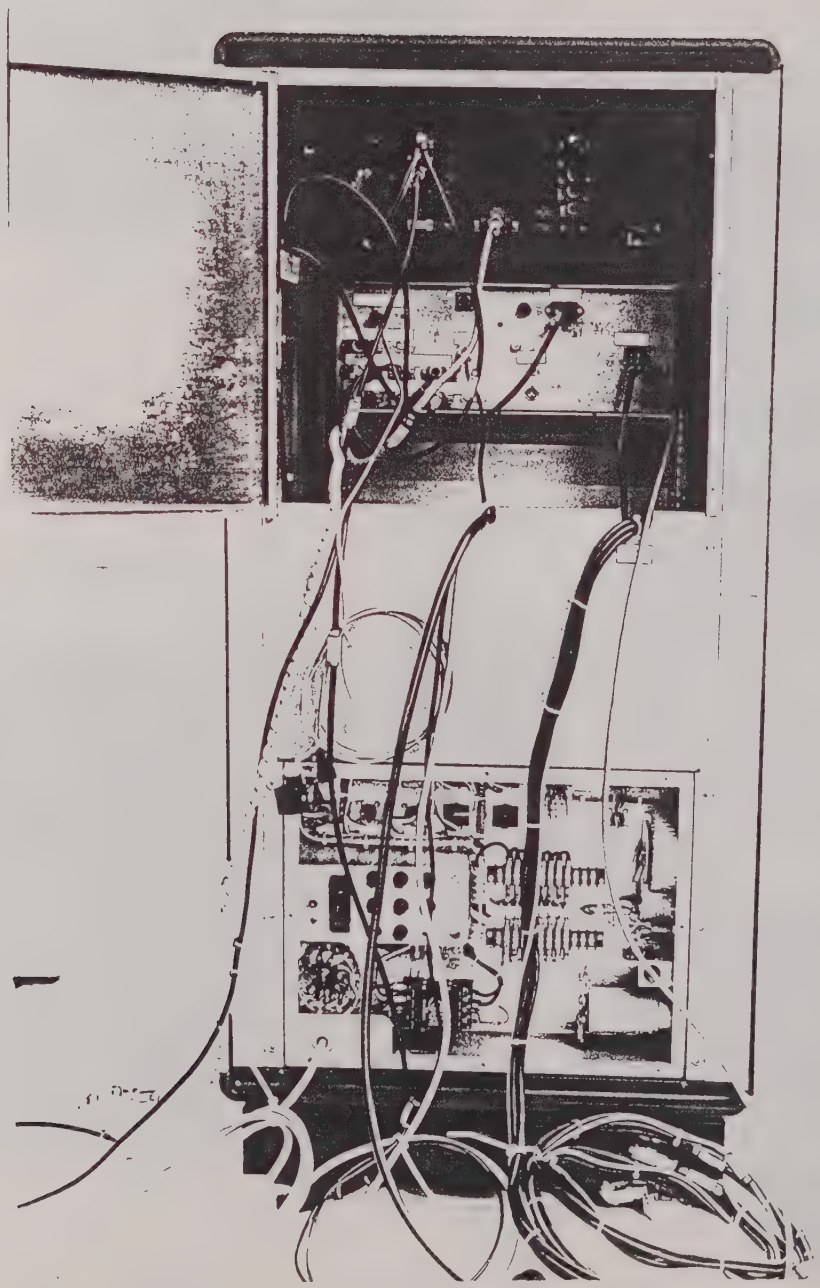


ILLUSTRATION 4. The control rack rear fittings - upper panel behind door (refer to section 4.2.)

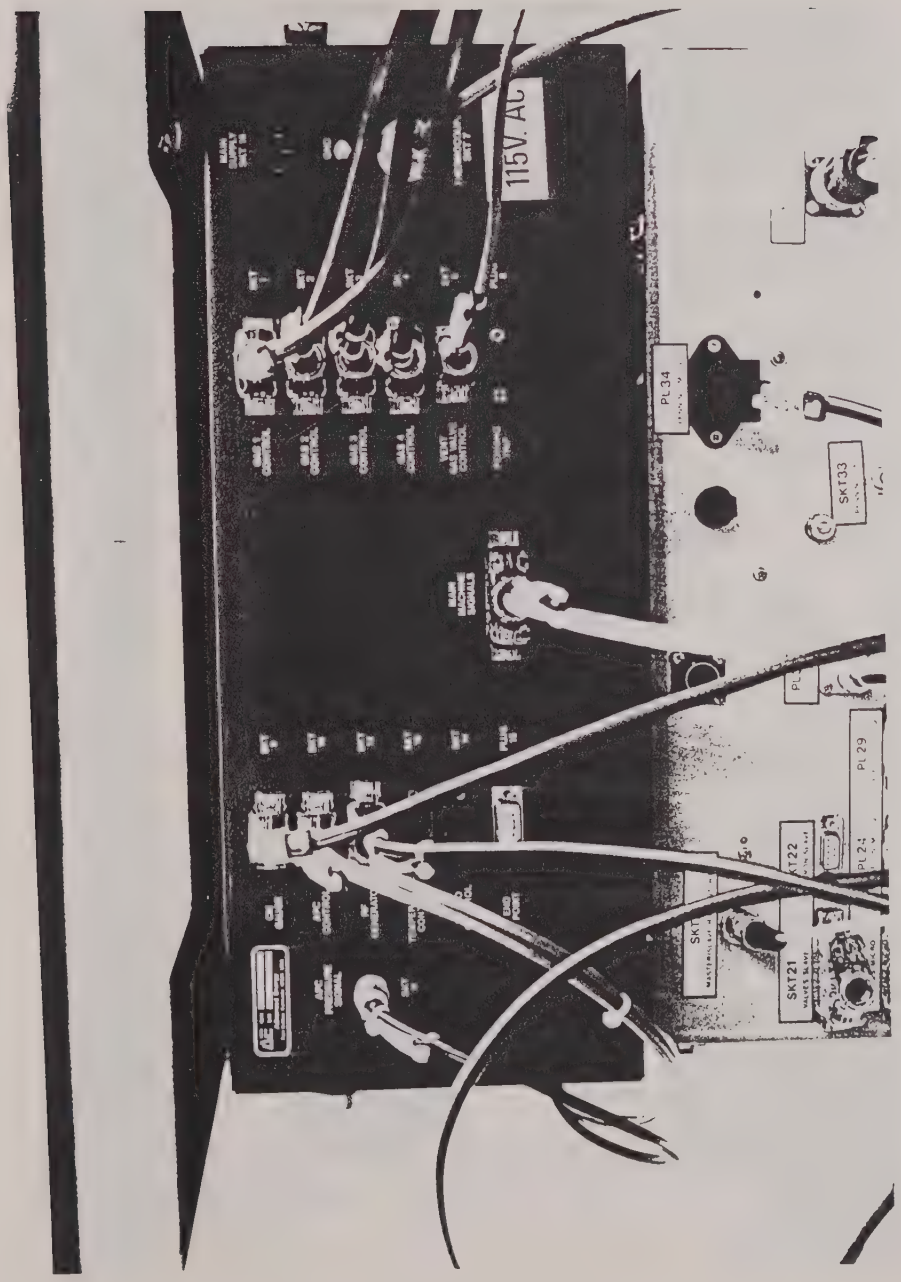


ILLUSTRATION 5. The control rack rear fittings - lower panel behind removable plate (see section 5.2.)

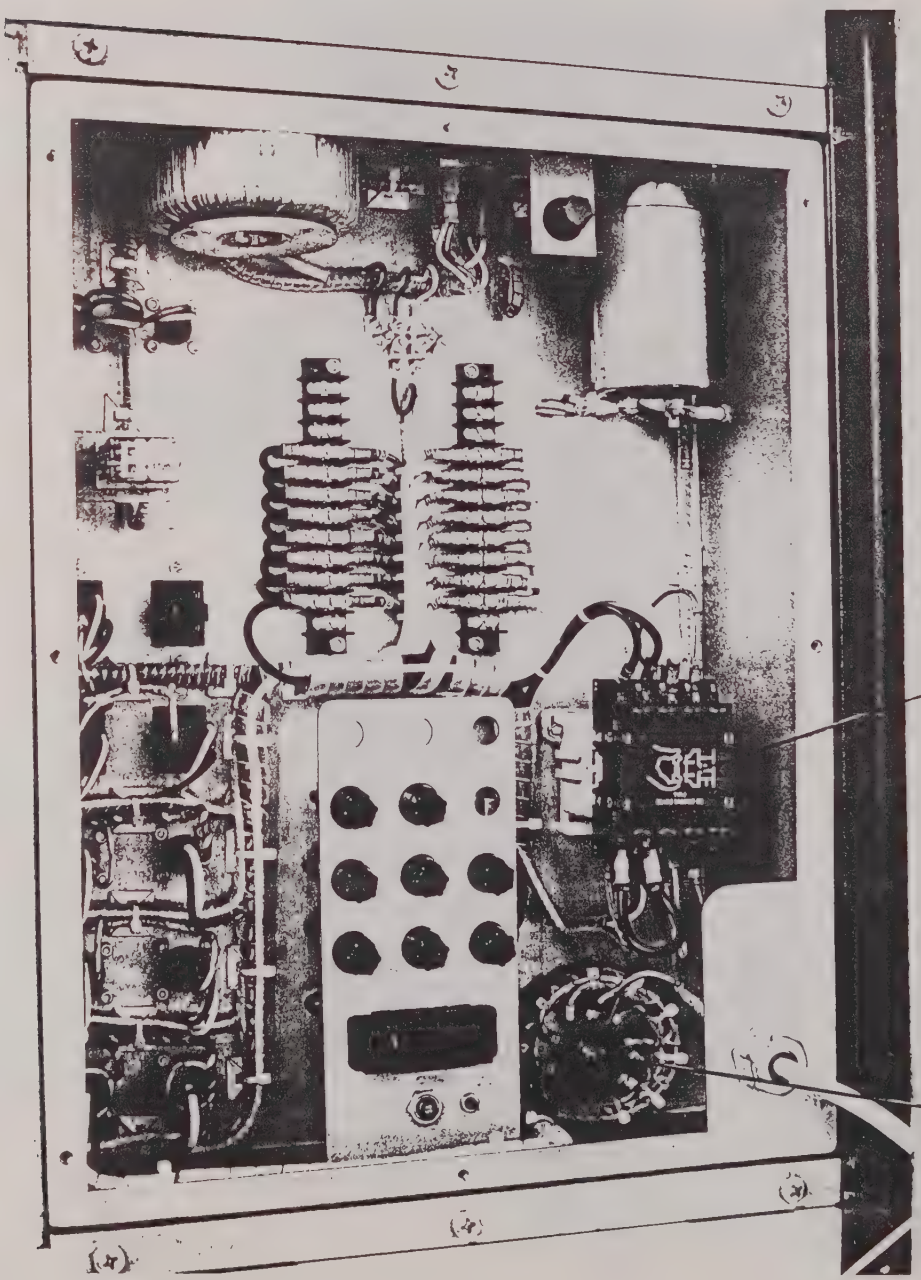


ILLUSTRATION 6. The power distribution fittings inside the control rack - situated to the rear of the generator rack on the front panel (for reference)

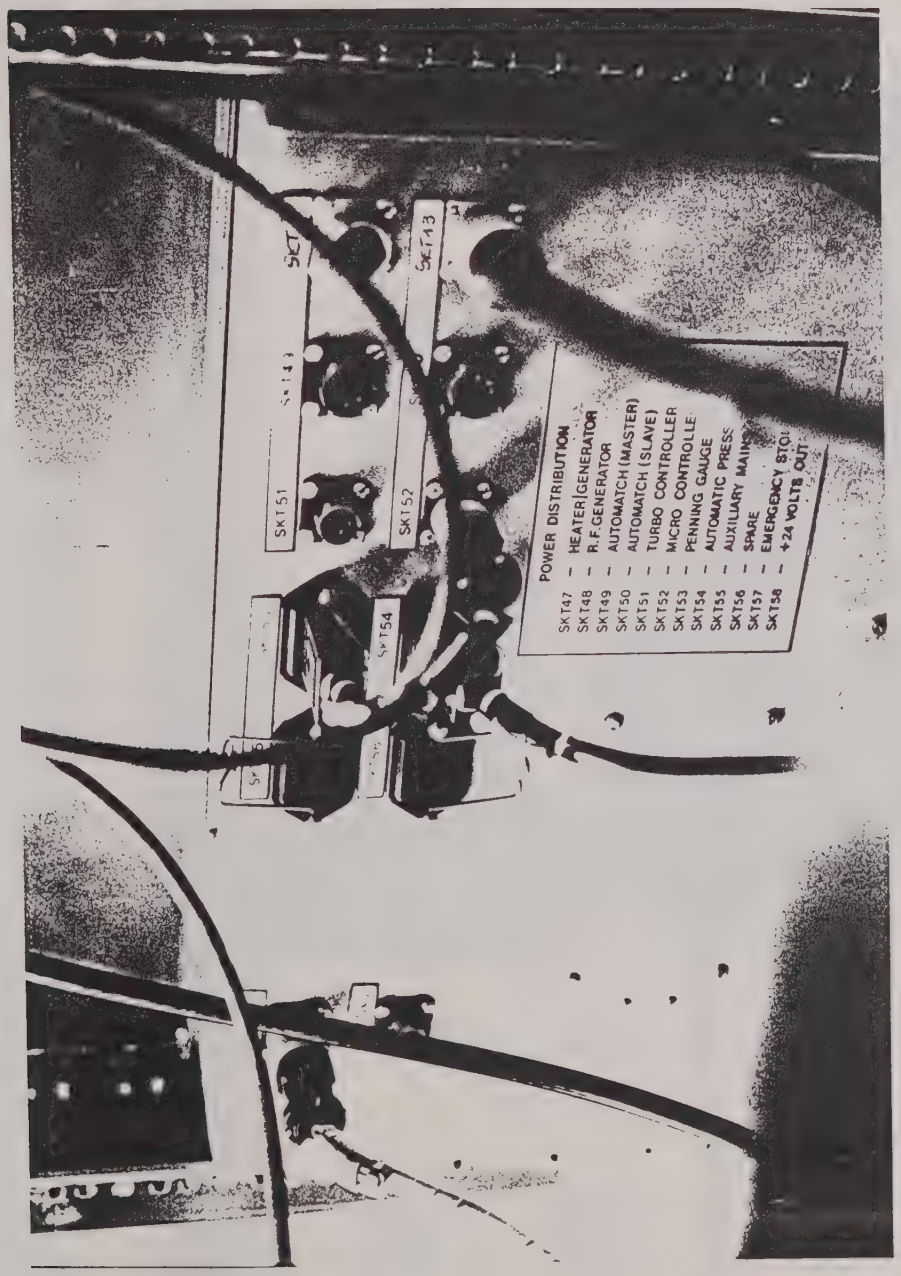


Illustration 7. The automatic pressure controller rear panel - situated within the control rack to the rear of the front panel (refer to sections 4 and 5)

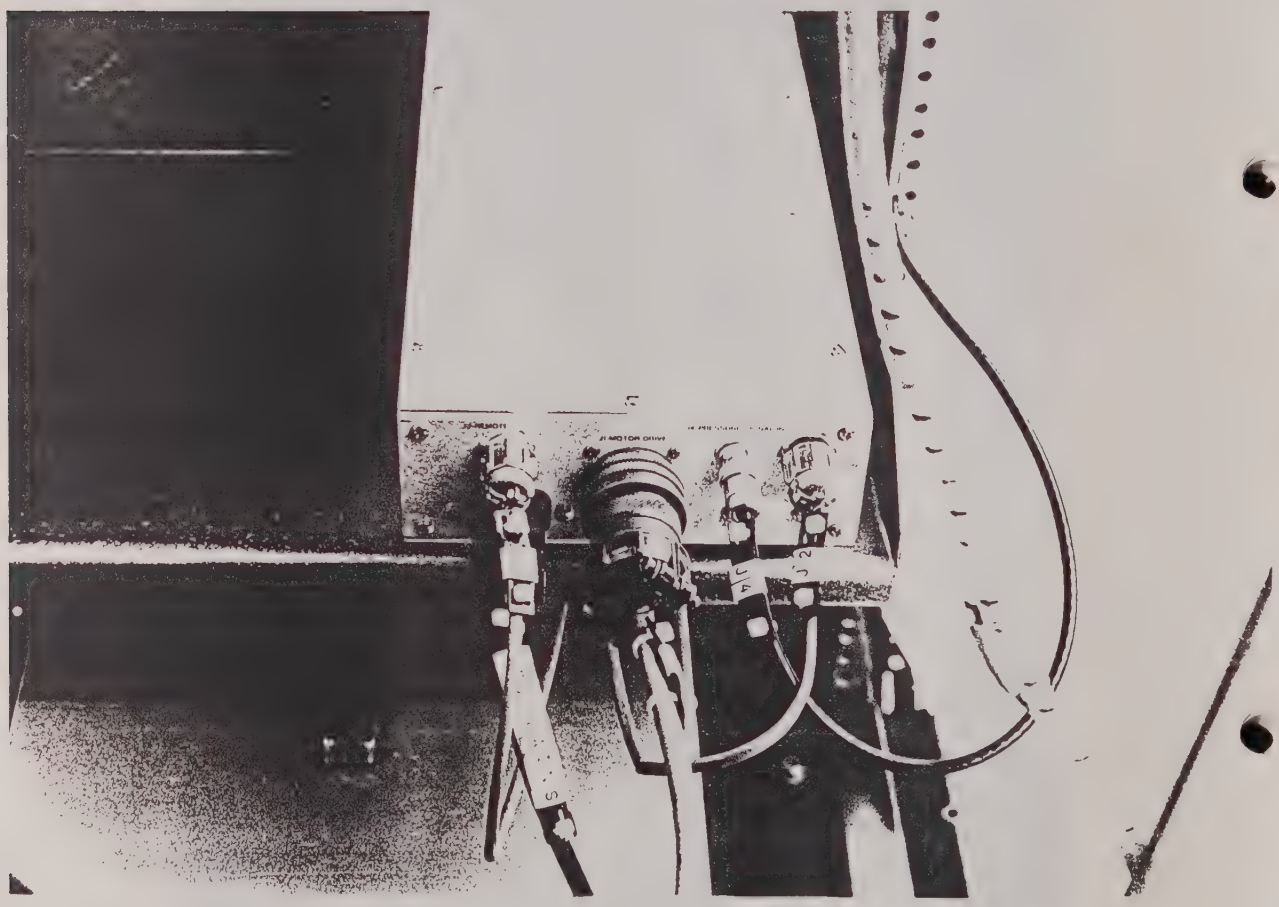


ILLUSTRATION 8. The micro-controller front panel, auto-stop button, penning gauge readout, DC bias meter and MASTER/SLAVE keyswitch (refer to sections 4, 5 and 6)

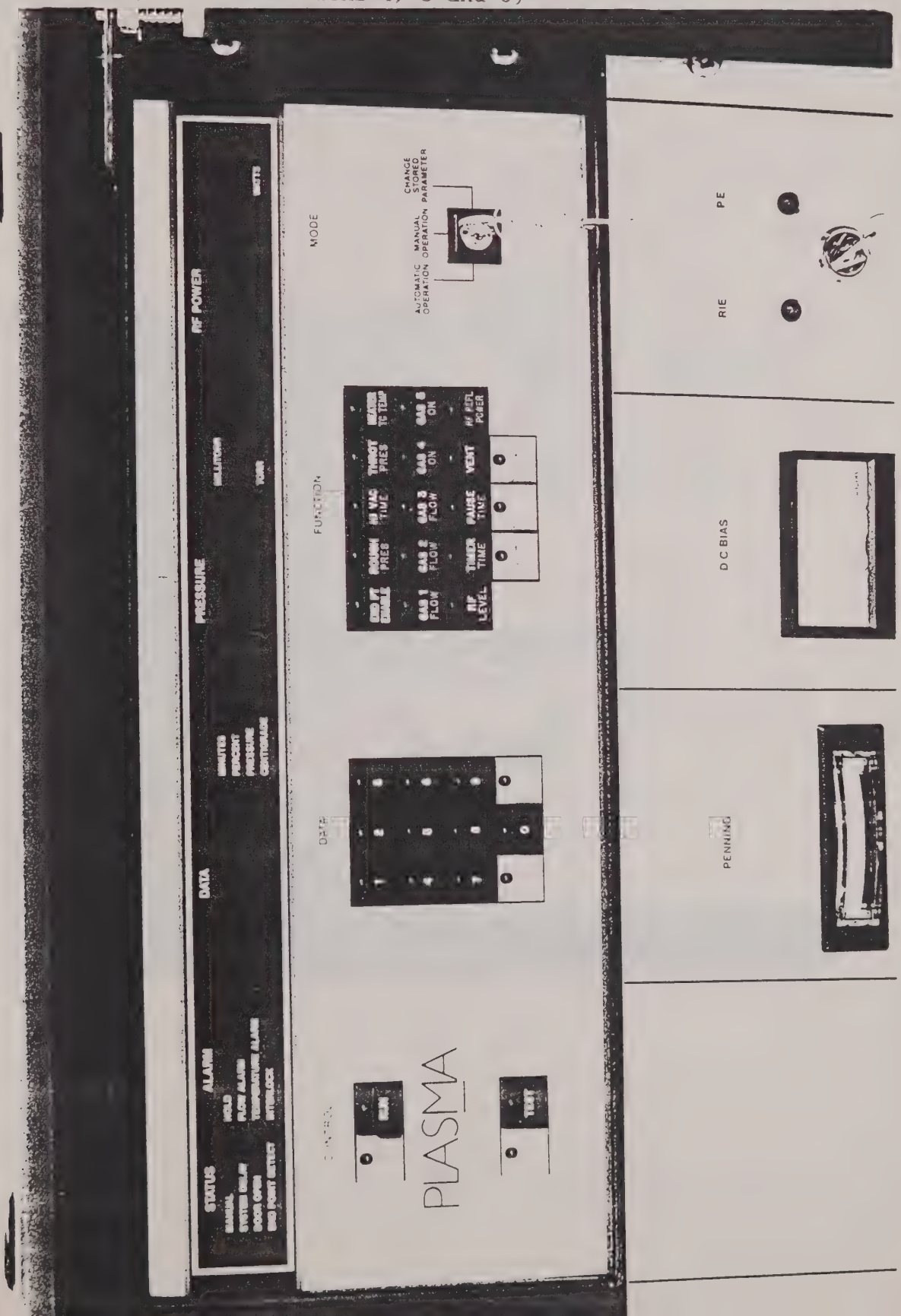
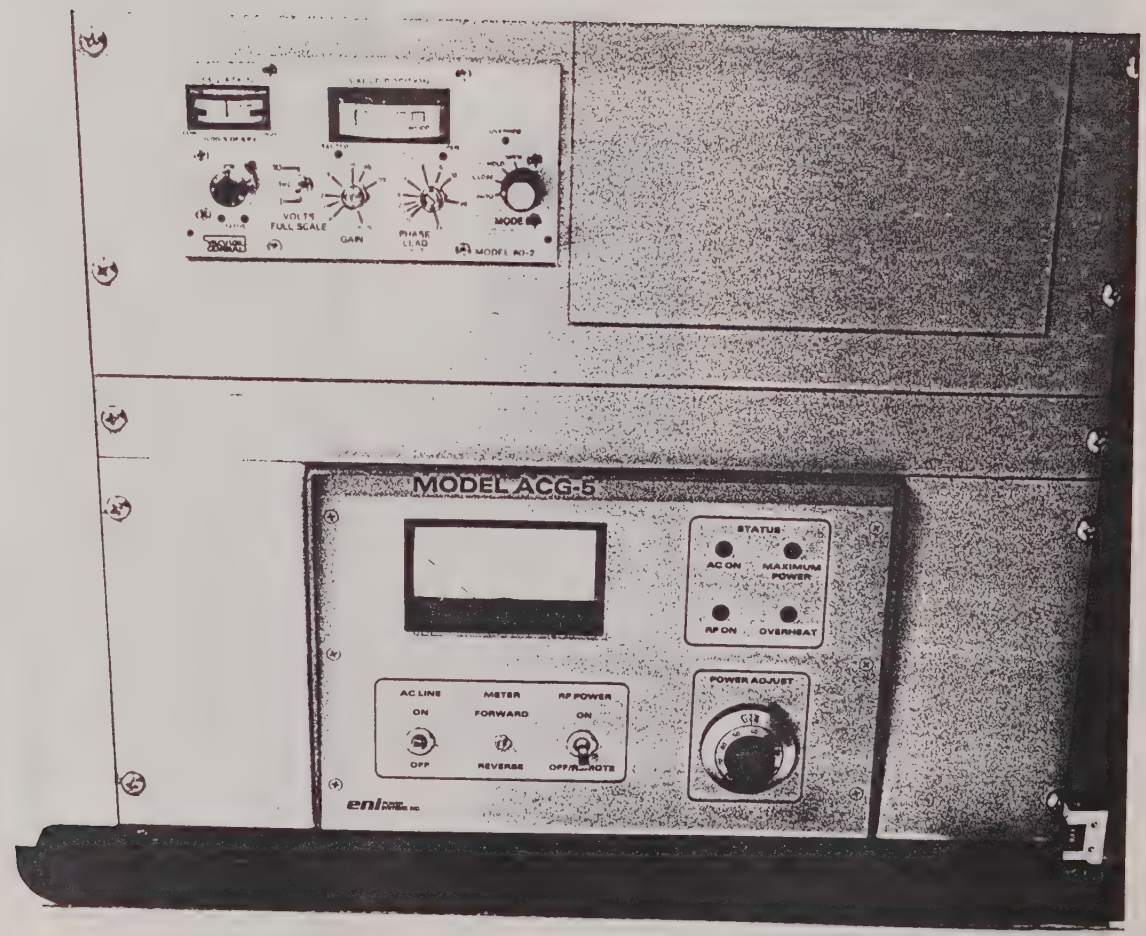
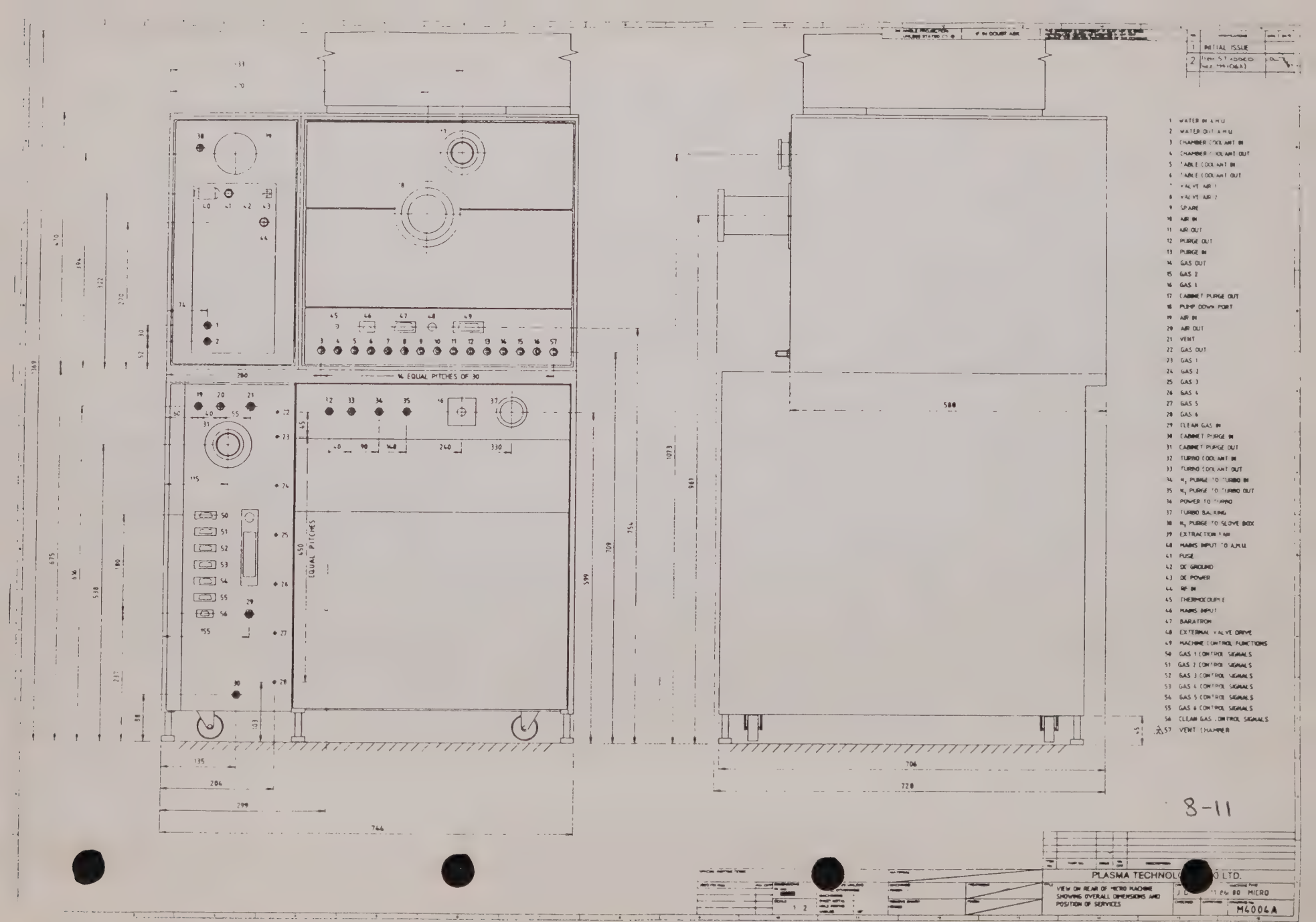


ILLUSTRATION 9. The control rack lower front panel showing automatic pressure controller and generator (see sections 4, 5, and 6.)




1 INITIAL ISSUE
2
1 WATER IN A.M.U.
2 WATER OUT A.M.U.
3 CHAMBER COOLANT IN
4 CHAMBER COOLANT OUT
5 TABLE COOLANT IN
6 TABLE COOLANT OUT
7 VALVE AIR 1
8 VALVE AIR 2
9 SPARE
10 AIR IN
11 AIR OUT
12 PURGE OUT
13 PURGE IN
14 GAS OUT
15 GAS 2
16 GAS 1
17 CABINET PURGE OUT
18 PUMP DOWN PORT
19 AIR IN
20 AIR OUT
21 VENT
22 GAS OUT
23 GAS 1
24 GAS 2
25 GAS 3
26 GAS 4
27 GAS 5
28 GAS 6
29 CLEAN GAS IN
30 CABINET PURGE IN
31 CABINET PURGE OUT
32 TURBO COOLANT IN
33 TURBO COOLANT OUT
34 N2 PURGE TO TURBO IN
35 N2 PURGE TO TURBO OUT
36 POWER TO TURBO
37 TURBO BALKING
38 N2 PURGE TO SLOVE BOX
39 EXTRACTION FAN
40 MAINS INPUT TO A.M.U.
41 FUSE
42 DC GROUND
43 DC POWER
44 RF IN
45 THERMOCOUPLE
46 MAINS INPUT
47 BARATRON
48 EXTERNAL VALVE DRIVE
49 MACHINE CONTROL FUNCTIONS
50 GAS 1 CONTROL SIGNALS
51 GAS 2 CONTROL SIGNALS
52 GAS 3 CONTROL SIGNALS
53 GAS 4 CONTROL SIGNALS
54 GAS 5 CONTROL SIGNALS
55 GAS 6 CONTROL SIGNALS
56 CLEAN GAS CONTROL SIGNALS
57 VENT CHAMBER
14 EQUAL PITCHES OF 30
EQUAL PITCHES
580
706
720
744
8-11
PLASMA TECHNOLOGY LTD.
VIEW ON REAR OF MICRO MACHINE SHOWING OVERALL DIMENSIONS AND POSITION OF SERVICES
M4004A

MICROP PLASMALAB

LIST OF DRAWING (ELECTRICAL)
REQUIRED FOR MACHINE
80 MICRO SYSTEM

E342A - WIRING DIAGRAM OF POWER DISTRIBUTION UNIT
ISSUE 1

E343A - WIRING DIAGRAM OF VALVE SWITCHING FOR A MASTER UNIT ONLY.
ISSUE 1

E344A - WIRING DIAGRAM OF VALVE SWITCHING FOR A MASTER AND SLAVE UNIT.
ISSUE 1

E345A - WIRING DIAGRAM FOR A BARATRON SWITCHING FOR A MASTER UNIT ONLY.
ISSUE 1

E346A - WIRING DIAGRAM OF BARATRON SWITCHING FOR A MASTER AND SLAVE
ISSUE 1 UNIT.

E347B - WIRING DIAGRAM OF TEMPERATURE CONTROL SYSTEM FOR A MASTER
ISSUE 1 AS A DP MACHINE ONLY.

E348B - WIRING DIAGRAM OF TEMPERATURE CONTROL SYSTEM (T/C) FOR
ISSUE 1 MASTER AND SLAVE AS RIE MACHINES.

E349A - WIRING DIAGRAM OF TEMPERATURE CONTROL SYSTEM FOR MASTER
ISSUE 1 AND SLAVE DP MACHINES.

E350A - WIRING DIAGRAM OF TEMPERATURE CONTROL SYSTEM FOR MASTER
ISSUE 1 AND SLAVE AS EITHER A DP OR RIE.

E351A - WIRING DIAGRAM FOR RF CONTROL, SWITCHING, AND DC BIAS,
ISSUE 2 FOR A MASTER AND SLAVE UNIT.

E352A - WIRING DIAGRAM FOR PENNING GAUGE CONTROL UNIT.
ISSUE 2

E353A - WIRING DIAGRAM OF GAS POD
ISSUE 1

E354B - WIRING OF MASTER/SLAVE CHANGEOVER KEYSWITCH, FOR
ISSUE 1 ANCILLARY CONTROL UNIT.

E357A - WIRING DIAGRAM GAS IN/VENT VALVES MASTER, SLAVE
ISSUE 1 SYSTEM.

E359A - WIRING DIAGRAM GAS POD, CLEAN GAS ON A MASS FLOW(80- 55
ISSUE 1 CONTOLLER).

E367A - WIRING DIAGRAM BARATRONS, 1 TORR AND 10 TORR MASTER
ISSUE 1 SLAVE SYSTEM.

E368B - KEYSWITCH WIRING BARATRONS 1 TORR AND 10 TORR
ISSUE 1 ANCILLARY CONTROL UNIT.

ANCILLARY CONTROL UNIT

E334B ISSUE 2 - WIRING DIAGRAM FOR PENNING AND R.F. TRIP PRINTED CIRSUIT BOARD.

E362 ISSUE 1 - CIRCUIT DIAGRAM DIFFERENTIAL GAIN AMPLIFIER PRINTED CIRCUIT BOARD.

N/A
ENI MW-5

AUTOMATCH

E328A ISSUE 1 - WIRING DIAGRAM AUTOMATCH UNIT.

E277B ISSUE 2 - CIRCUIT DIAGRAM FOR MOTOR DRIVE PRINTED CIRCUIT BOARD.

E278B ISSUE 1 - CIRCUIT DIAGRAM FOR MOTOR CONTROL PRINTED CURCUIT BOARD.

E279B ISSUE 1 - CIRCUIT DIAGRAM FOR PHASE AND MAGNITUDE DETECTION, PRINTED CIRCUIT BOARD.

E280B ISSUE 1 - CIRCUIT DIAGRAM FOR RF ON DETECTION PRINTED CIRCUIT BOARD.

AUTOMATIC PRESSURE CONTROLLER

E329A ISSUE 1 - CIRCUIT AND WIRING DIAGRAM FOR AUTOMATIC PRESSURE CONTROLLER (VACUUM GENERAL 80-2)

SILANE FURNACE

E228A ISSUE 1 - WIRING DIAGRAM FOR FREE STANDING SILANE FURNACE.

BARATRONS

E281B ISSUE 1 - BARATRON WIRING, MASTER AND SLAVE.

THE FOLLOWING DRAWINGS ARE FOR REFERENCE ONLY, AND TO BE USED TO SHOW THE R.F. PATH THRU MACHINE TO CHAMBER (ALL CABLE IDENTS ARE FOR STANDARD 80 SYSTEM). PLEASE NOTE:

EARTH ELECTRODE WIRING

E271B ISSUE 1 - WIRING DIAGRAM HIGH FREQUENCY RF CABLES RIE SYSTEM.

E272B ISSUE 1 - WIRING DIAGRAM HIGH FREQUENCY RF CABLES AND DC BIAS.

E269B ISSUE 1 - WIRING DIAGRAM HIGH FREQUENCY EF CABLES DP SYSTEM.

E270B ISSUE 1 - WIRING DIAGRAM HIGH FREQUENCY RF CABLES AND DC BIAS.

E268A ISSUE 1 - WIRING DIAGRAM HIGH AND LOW RF FREQUENCY CABLES AND DC BIAS.

E273B ISSUE 1 - WIRING DIAGRAM LOW FREQUENCY RF CABLES DP AND PE SYSTEM.

MICRO CONTROLLER, (ADVANCED ENERGY)

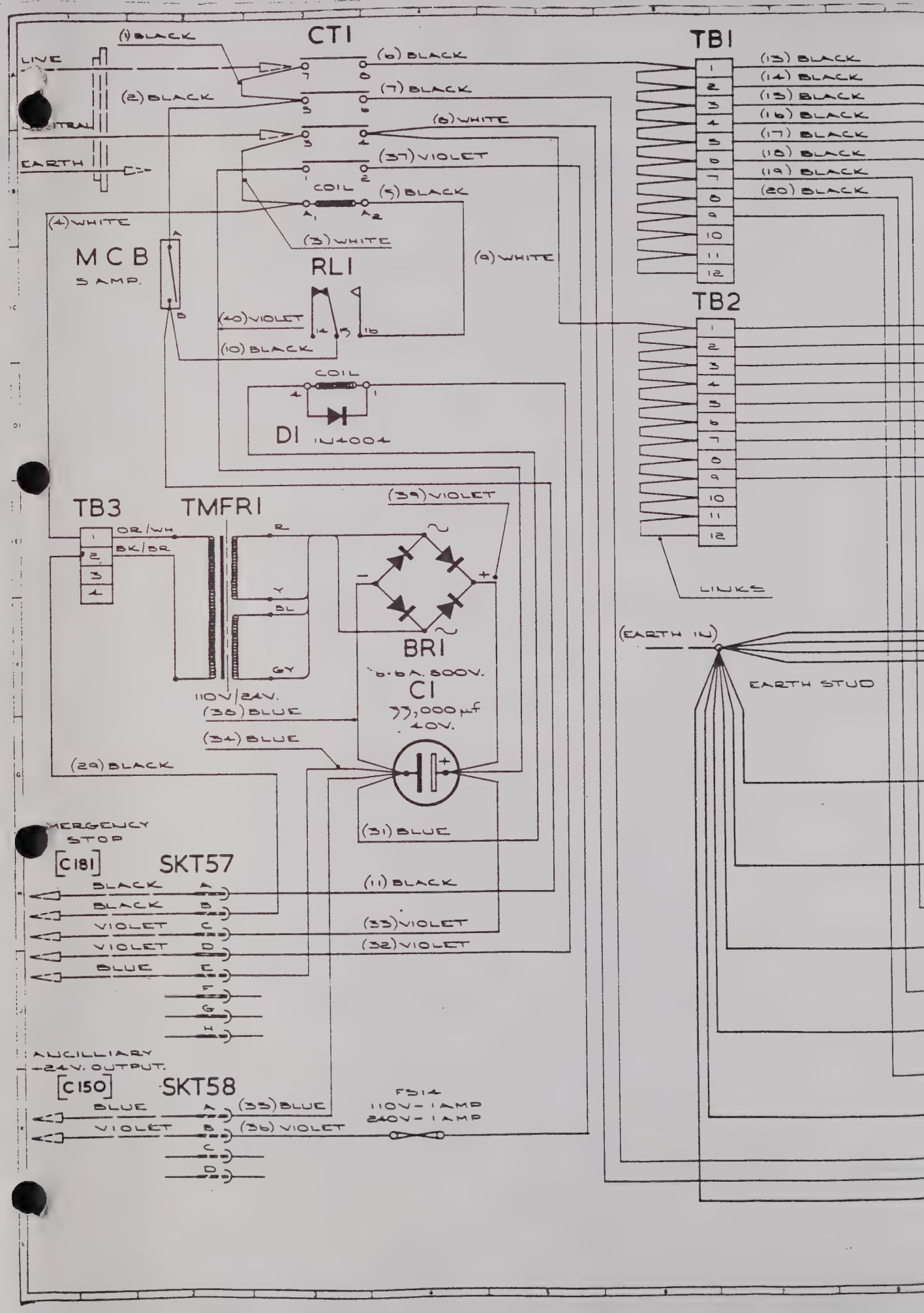
E363A ISSUE 1 - LOGIC SCHEMATIC
SHEET 1
SHEET 2
SHEET 3

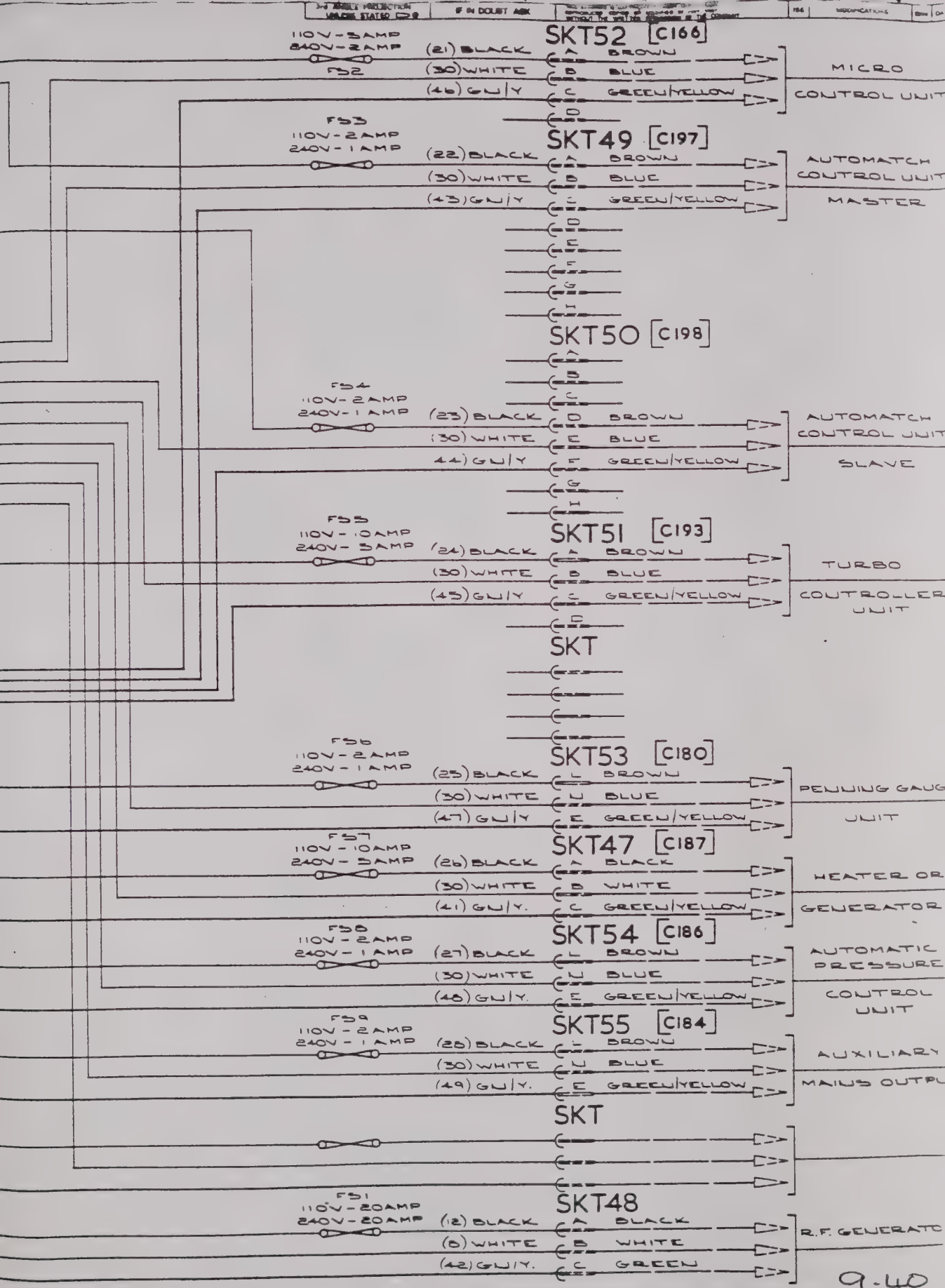
E364B ISSUE 1 - DISPLAY SCHEMATIC
SHEET 1
SHEET 2

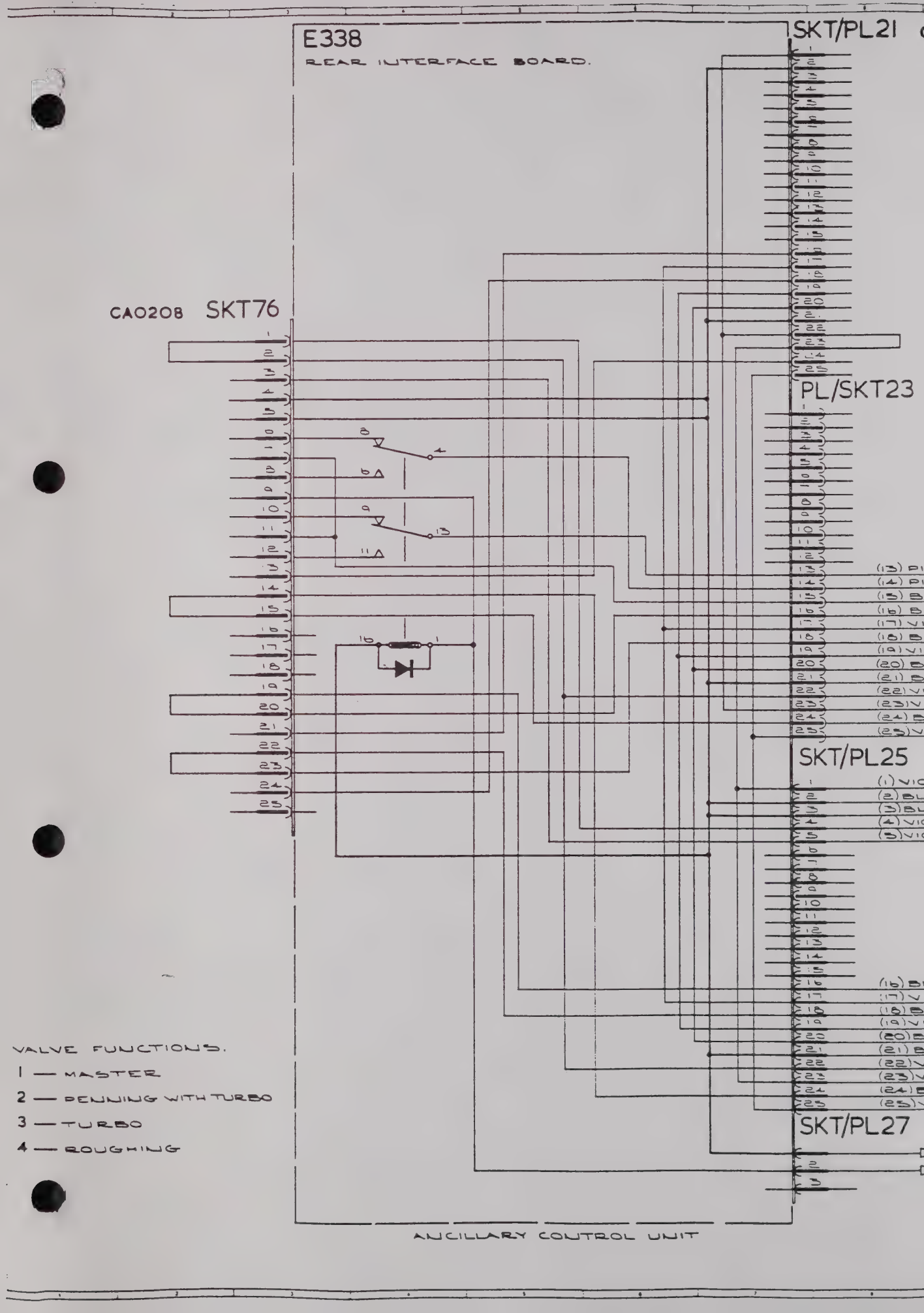
E365B ISSUE 1 - REAR INTERFACE BOARD SCHEMATIC

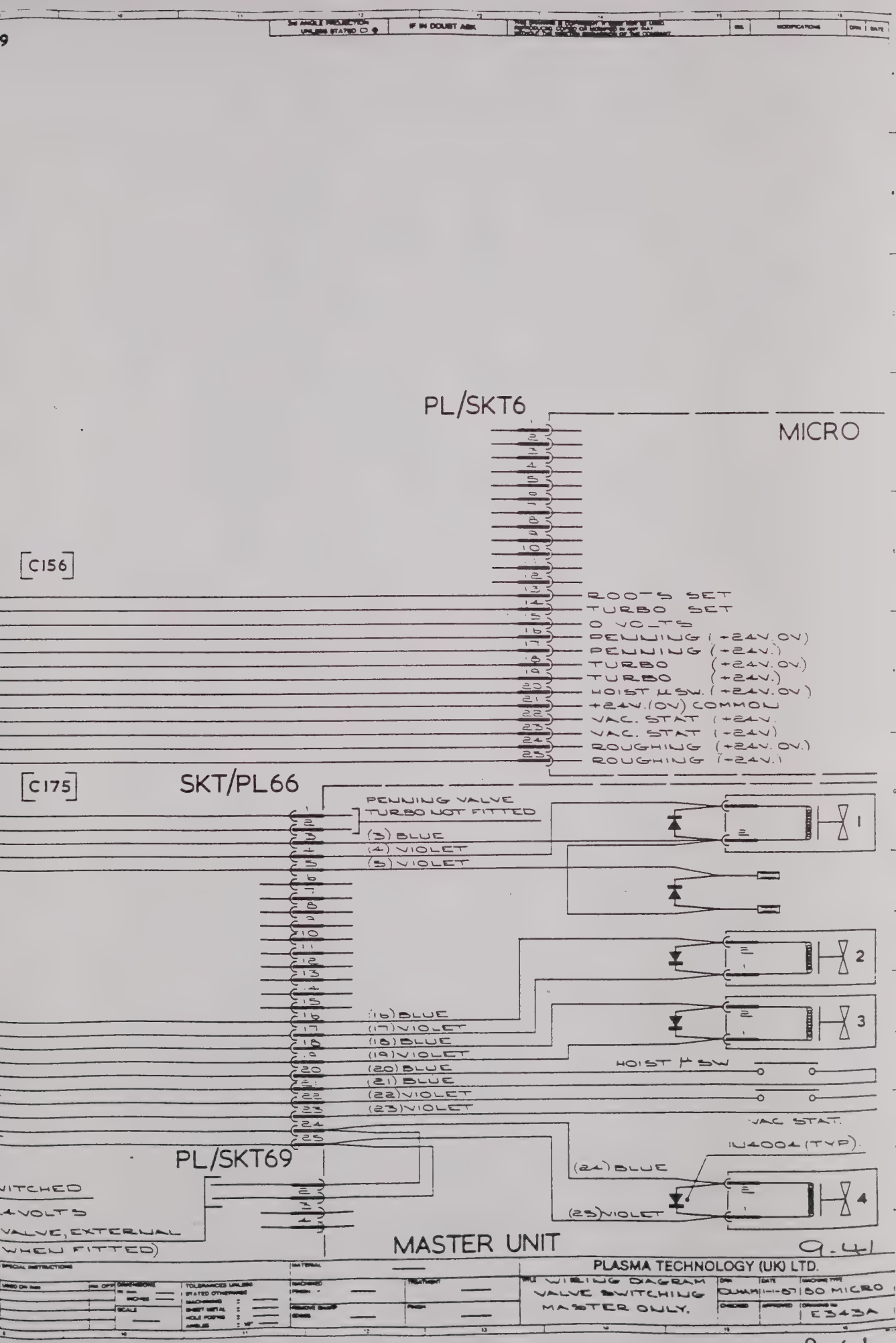
E366B ISSUE - SYSTEM SCHEMATIC

N/A PAL-68000


CT1
TB1
TB2
TB3
TMFR1
MCB
5 AMP.
RL1
COIL
D1 IN4004
BR1
6·6A. 800V.
C1
77,000 µf
40V.
110V/24V.
LINKS
EARTH STUD
(EARTH IN)
EMERGENCY STOP
[C181]
SKT57
ANCILLIARY +24V. OUTPUT.
[C150]
SKT58
FS14
110V - 1AMP
240V - 1AMP
LIVE
NEUTRAL
EARTH
(1) BLACK
(2) BLACK
(3) WHITE
(4) WHITE
(5) BLACK
(6) BLACK
(7) BLACK
(8) WHITE
(9) WHITE
(10) BLACK
(11) BLACK
(12) BLACK
(13) BLACK
(14) BLACK
(15) BLACK
(16) BLACK
(17) BLACK
(18) BLACK
(19) BLACK
(20) BLACK
(29) BLACK
(30) VIOLET
(31) BLUE
(32) VIOLET
(33) VIOLET
(34) BLUE
(35) BLUE
(36) VIOLET
(37) VIOLET
(38) BLUE
(39) VIOLET
OR/WH
BK/BR
R
Y
BL
GY


SKT52 [C166]
F52
110V-5AMP
240V-2AMP
(21) BLACK
(30) WHITE
(46) GN/Y
A BROWN
B BLUE
C GREEN/YELLOW
D
MICRO CONTROL UNIT
F53
110V-2AMP
240V-1AMP
SKT49 [C197]
(22) BLACK
(30) WHITE
(43) GN/Y
A BROWN
B BLUE
C GREEN/YELLOW
D
E
F
G
H
AUTOMATCH CONTROL UNIT MASTER
SKT50 [C198]
A
B
C
F54
110V-2AMP
240V-1AMP
(23) BLACK
(30) WHITE
44) GN/Y
D BROWN
E BLUE
F GREEN/YELLOW
G
H
AUTOMATCH CONTROL UNIT SLAVE
F55
110V-10AMP
240V-5AMP
SKT51 [C193]
(24) BLACK
(30) WHITE
(45) GN/Y
A BROWN
B BLUE
C GREEN/YELLOW
D
TURBO CONTROLLER UNIT
SKT
F56
110V-2AMP
240V-1AMP
SKT53 [C180]
(25) BLACK
(30) WHITE
(47) GN/Y
L BROWN
N BLUE
E GREEN/YELLOW
PENNING GAUG UNIT
F57
110V-10AMP
240V-5AMP
SKT47 [C187]
(26) BLACK
(30) WHITE
(41) GN/Y.
A BLACK
B WHITE
C GREEN/YELLOW
HEATER OR GENERATOR
F58
110V-2AMP
240V-1AMP
SKT54 [C186]
(27) BLACK
(30) WHITE
(48) GN/Y.
L BROWN
N BLUE
E GREEN/YELLOW
AUTOMATIC PRESSURE CONTROL UNIT
F59
110V-2AMP
240V-1AMP
SKT55 [C184]
(28) BLACK
(30) WHITE
(49) GN/Y.
L BROWN
N BLUE
E GREEN/YELLOW
AUXILIARY MAINS OUTPU
SKT
F51
110V-20AMP
240V-20AMP
SKT48
(12) BLACK
(6) WHITE
(42) GN/Y.
A BLACK
B WHITE
C GREEN
R.F. GENERATO
9-40
SPECIAL INSTRUCTIONS
MATERIAL
PLASMA TECHNOLOGY (UK) LTD.
TITLE WIRING DIAGRAM POWER DISTRIBUTION UNIT
DRAWN 1/11/86
MACHINE TYPE 60 MICE
DRAWING No E342
9-40


E338
REAR INTERFACE BOARD.
SKT/PL21
CA0208 SKT76
PL/SKT23
SKT/PL25
SKT/PL27
VALVE FUNCTIONS.
1 — MASTER
2 — PENNING WITH TURBO
3 — TURBO
4 — ROUGHING
ANCILLARY CONTROL UNIT


PL/SKT6
MICRO
C156
ROOTS SET
TURBO SET
0 VOLTS
PENNING (+24V. 0V)
PENNING (+24V.)
TURBO (+24V. 0V.)
TURBO (+24V.)
HOIST μSW. (+24V. 0V)
+24V. (0V) COMMON
VAC. STAT (+24V.
VAC. STAT (+24V)
ROUGHING (+24V. 0V.)
ROUGHING (+24V.)
C175
SKT/PL66
PENNING VALVE
TURBO NOT FITTED
(3) BLUE
(4) VIOLET
(5) VIOLET
(16) BLUE
(17) VIOLET
(18) BLUE
(19) VIOLET
(20) BLUE
(21) BLUE
(22) VIOLET
(23) VIOLET
HOIST μ SW
VAC STAT.
IN4001 (TYP).
(24) BLUE
(25) VIOLET
1
2
3
4
PL/SKT69
MASTER UNIT
9-41
PLASMA TECHNOLOGY (UK) LTD.
WIRING DIAGRAM
VALVE SWITCHING
MASTER ONLY.
DWN
DATE
DJHAM 1-1-87
80 MICRO
E343A
9-41

ANCILLARY CONTROL UNIT.

E338

REAR INTERFACE BOARD.

SKT/PL

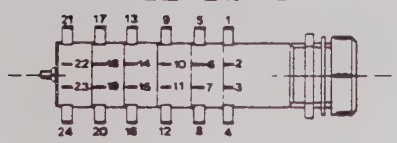
PL/SKT

SKT/PL

SKT/PL

CA0207

KEYSWITCH



PL/SKT76

(13) PINK
(15) VIOLET
(14) PINK
(12) BLUE
(2) BLUE
MASTER
0 VOLTS
SLAVE
(25) PINK
MASTER
0 VOLTS
SLAVE
(19) PINK
(17) PINK
(16) VIOLET
(30) BLUE
(28) BLUE
(32) BLUE
(31) BLUE
(29) BLUE
(33) BLUE

SLAVE LED

4K7 1/4W

4K7 1/4W.

MASTER LED

(14) PINK

(13) PINK

VALVE FUNCTION. MASTER/SLAVE

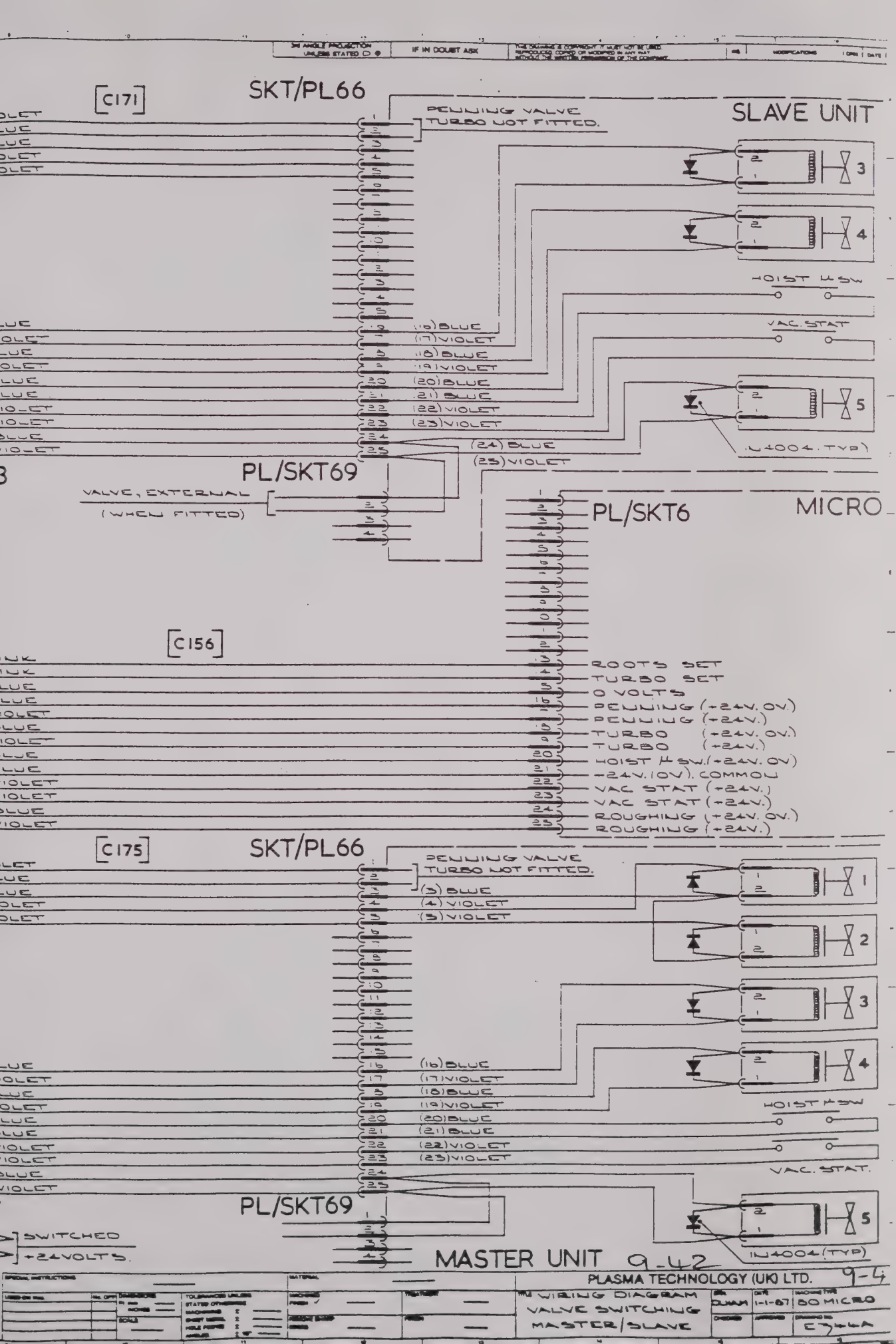
1 — MASTER

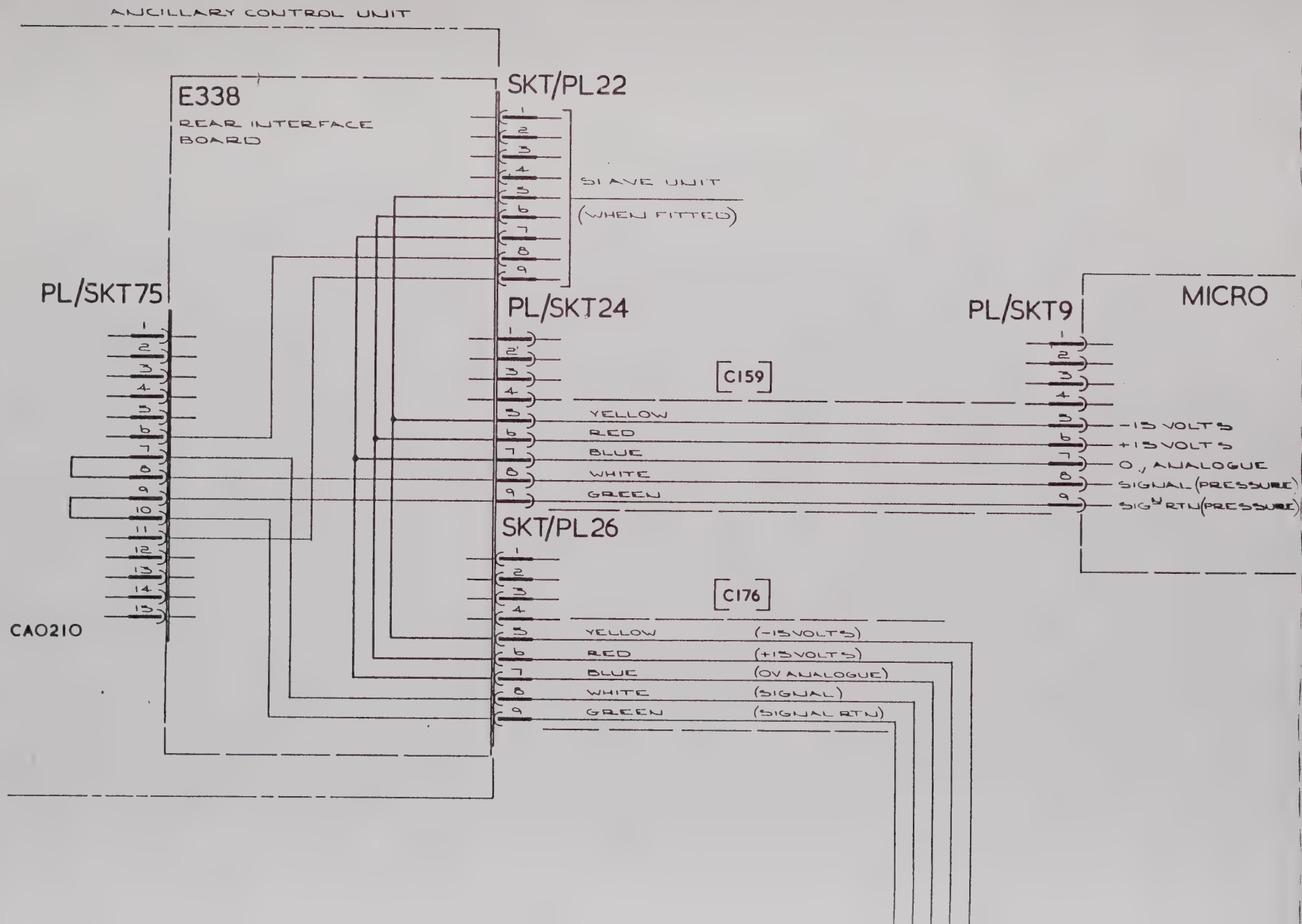
2 — SLAVE

? — PEUNING WITH TURBO

TURBO

ROUGHING


C171
SKT/PL66
PENNING VALVE
TURBO NOT FITTED.
SLAVE UNIT
HOIST μ SW
VAC. STAT
(16) BLUE
(17) VIOLET
(18) BLUE
(19) VIOLET
(20) BLUE
(21) BLUE
(22) VIOLET
(23) VIOLET
(24) BLUE
(25) VIOLET
IN4004 TYP)
PL/SKT69
VALVE, EXTERNAL
(WHEN FITTED)
PL/SKT6
MICRO
C156
ROOTS SET
TURBO SET
0 VOLTS
PENNING (+24V. 0V.)
PENNING (+24V.)
TURBO (+24V. 0V.)
TURBO (+24V.)
HOIST μ SW. (+24V. 0V)
+24V. 10V). COMMON
VAC STAT (+24V.)
VAC STAT (+24V.)
ROUGHING (+24V. 0V.)
ROUGHING (+24V.)
C175
SKT/PL66
PENNING VALVE
TURBO NOT FITTED.
(3) BLUE
(4) VIOLET
(5) VIOLET
(16) BLUE
(17) VIOLET
(18) BLUE
(19) VIOLET
(20) BLUE
(21) BLUE
(22) VIOLET
(23) VIOLET
HOIST μ SW
VAC. STAT.
IN4004 (TYP)
PL/SKT69
SWITCHED
+24 VOLTS.
MASTER UNIT 9-42
PLASMA TECHNOLOGY (UK) LTD.
9-4
WIRING DIAGRAM
VALVE SWITCHING
MASTER/SLAVE
1-1-87
50 MICRO


ANCILLARY CONTROL UNIT
E338
REAR INTERFACE BOARD
SKT/PL22
SLAVE UNIT
(WHEN FITTED)
PL/SKT75
PL/SKT24
PL/SKT9
MICRO
C159
YELLOW
RED
BLUE
WHITE
GREEN
-15 VOLTS
+15 VOLTS
0, ANALOGUE
SIGNAL (PRESSURE)
SIGNAL RTN (PRESSURE)
SKT/PL26
C176
YELLOW (-15VOLTS)
RED (+15VOLTS)
BLUE (0V ANALOGUE)
WHITE (SIGNAL)
GREEN (SIGNAL RTN)
CA0210

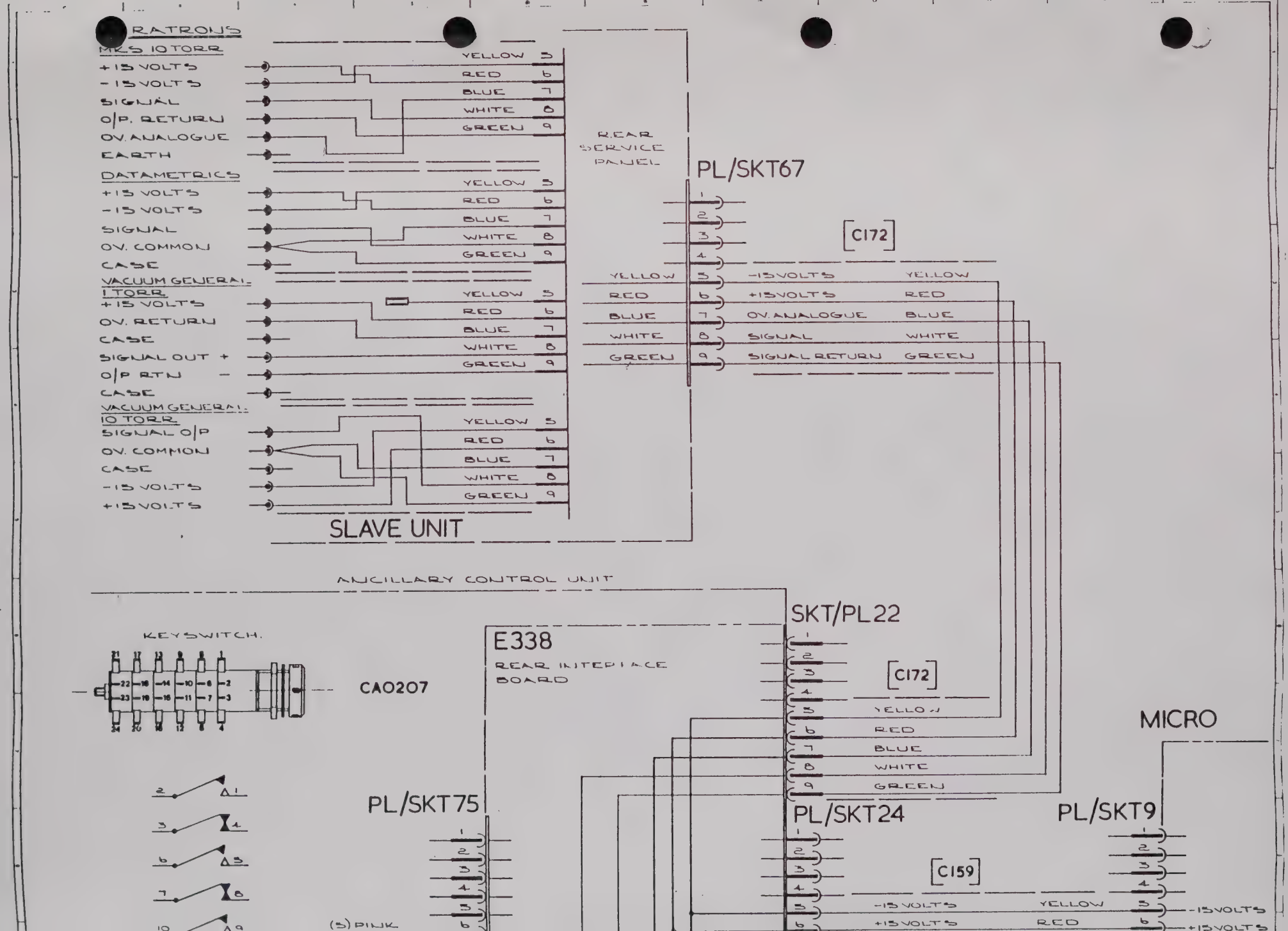
NO.	DESCRIPTION	DRN	DATE
1	INITIAL ISSUE	DLHAM	1-1-87

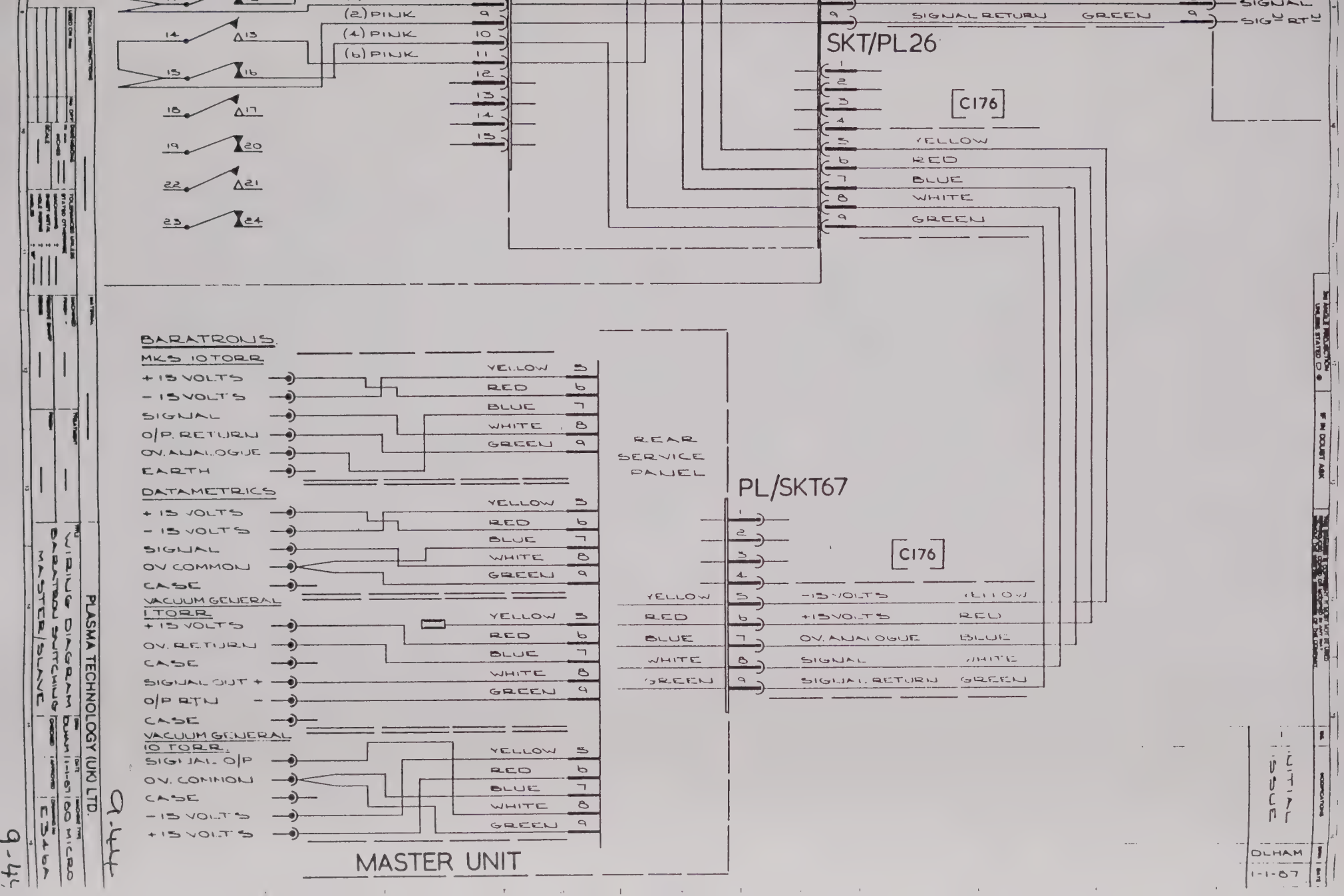
9-43

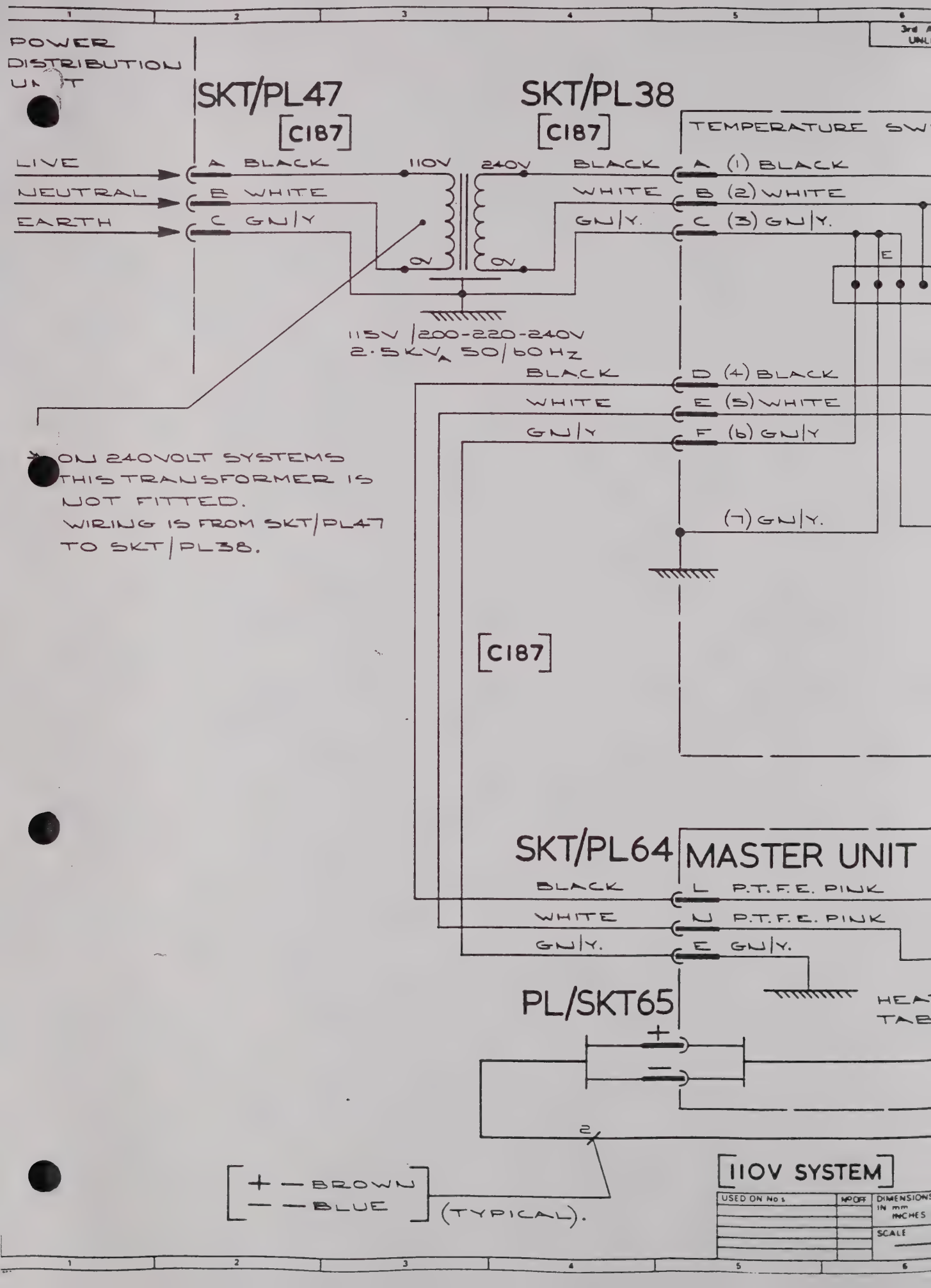
PLASMA TECHNOLOGY (UK) LTD.

TITLE	WIRING DIAGRAM BARATRON MASTER/SLAVE	DRN DLHAM 1-1-87	MACHINE TYPE 80 MICRO
		CHECKED	DRAWING NO. E345A.

9-43


RATRONS
MKS 10 TORR
+15 VOLTS
-15 VOLTS
SIGNAL
O/P. RETURN
0V. ANALOGUE
EARTH
DATAMETRICS
+15 VOLTS
-15 VOLTS
SIGNAL
0V. COMMON
CASE
VACUUM GENERAL
1 TORR
+15 VOLTS
0V. RETURN
CASE
SIGNAL OUT +
O/P RTN -
CASE
VACUUM GENERAL
10 TORR
SIGNAL O/P
0V. COMMON
CASE
-15 VOLTS
+15 VOLTS
YELLOW 5
RED 6
BLUE 7
WHITE 8
GREEN 9
SLAVE UNIT
REAR SERVICE PANEL
PL/SKT67
C172
YELLOW -15VOLTS YELLOW
RED +15VOLTS RED
BLUE 0V. ANALOGUE BLUE
WHITE SIGNAL WHITE
GREEN SIGNAL RETURN GREEN
ANCILLARY CONTROL UNIT
KEYSWITCH.
CA0207
E338
REAR INTERFACE BOARD
SKT/PL22
C172
YELLOW
RED
BLUE
WHITE
GREEN
MICRO
PL/SKT75
PL/SKT24
C159
-15 VOLTS YELLOW
+15 VOLTS RED
PL/SKT9
-15VOLTS
+15VOLTS
(5) PINK


(2) PINK
(4) PINK
(6) PINK
SIGNAL RETURN GREEN
SKT/PL26
C176
YELLOW
RED
BLUE
WHITE
GREEN
BARATRONS
MKS 10 TORR
+15 VOLTS
-15 VOLTS
SIGNAL
O/P RETURN
OV. ANALOGUE
EARTH
DATAMETRICS
+15 VOLTS
-15 VOLTS
SIGNAL
OV COMMON
CASE
VACUUM GENERAL
1 TORR
+15 VOLTS
OV. RETURN
CASE
SIGNAL OUT +
O/P RTN -
CASE
VACUUM GENERAL
10 TORR:
SIGNAL O/P
OV. COMMON
CASE
-15 VOLTS
+15 VOLTS
REAR SERVICE PANEL
PL/SKT67
C176
-15 VOLTS
+15 VOLTS
OV. ANALOGUE
SIGNAL
SIGNAL RETURN
MASTER UNIT
PLASMA TECHNOLOGY (UK) LTD.
WIRING DIAGRAM
BARATRON SWITCHING
MASTER/SLAVE
DWN 11-07-100 MICRO
ES46A
INITIAL ISSUE
OLHAM
1-1-87


POWER DISTRIBUTION UNIT
SKT/PL47
[C187]
SKT/PL38
[C187]
TEMPERATURE SW
LIVE
NEUTRAL
EARTH
A BLACK
B WHITE
C GN/Y
110V
240V
BLACK
WHITE
GN/Y.
A (1) BLACK
B (2) WHITE
C (3) GN/Y.
E
0V
0V
115V / 200-220-240V
2·5 KVA 50/60 Hz
BLACK
WHITE
GN/Y
D (4) BLACK
E (5) WHITE
F (6) GN/Y
(7) GN/Y.
* ON 240VOLT SYSTEMS THIS TRANSFORMER IS NOT FITTED. WIRING IS FROM SKT/PL47 TO SKT/PL38.
[C187]
SKT/PL64
MASTER UNIT
BLACK
WHITE
GN/Y.
L P.T.F.E. PINK
N P.T.F.E. PINK
E GN/Y.
PL/SKT65
+
—
2
[+ — BROWN
— — BLUE] (TYPICAL).
110V SYSTEM
USED ON Nos
NPOFF
DIMENSIONS IN mm INCHES
SCALE

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ISS	MODIFICATIONS	DRN	DATE

CHING UNIT

10 AMP (RESET) CIRCUIT BREAKER

8 AMP.

TB

SKT/PL39

[C189]

(9) BLACK

(4) BLACK — A — BLACK

(12) BLACK — B — BLACK

C

(11) BLACK — D — BLACK

(10) WHITE — E — WHITE

(8) GN/Y — F — GN/Y.

TEMPERATURE CONTROLLER.

15

13

12

PL/SKT40

[C190]

(13) VIOLET — A — VIOLET

(14) BLUE — B — BLUE

C

D

18

19

+

−

2

5

4

[C157] (2)

PL/SKT7

MICRO CONTROLLER.

PL/SKT13

[C163]

RED

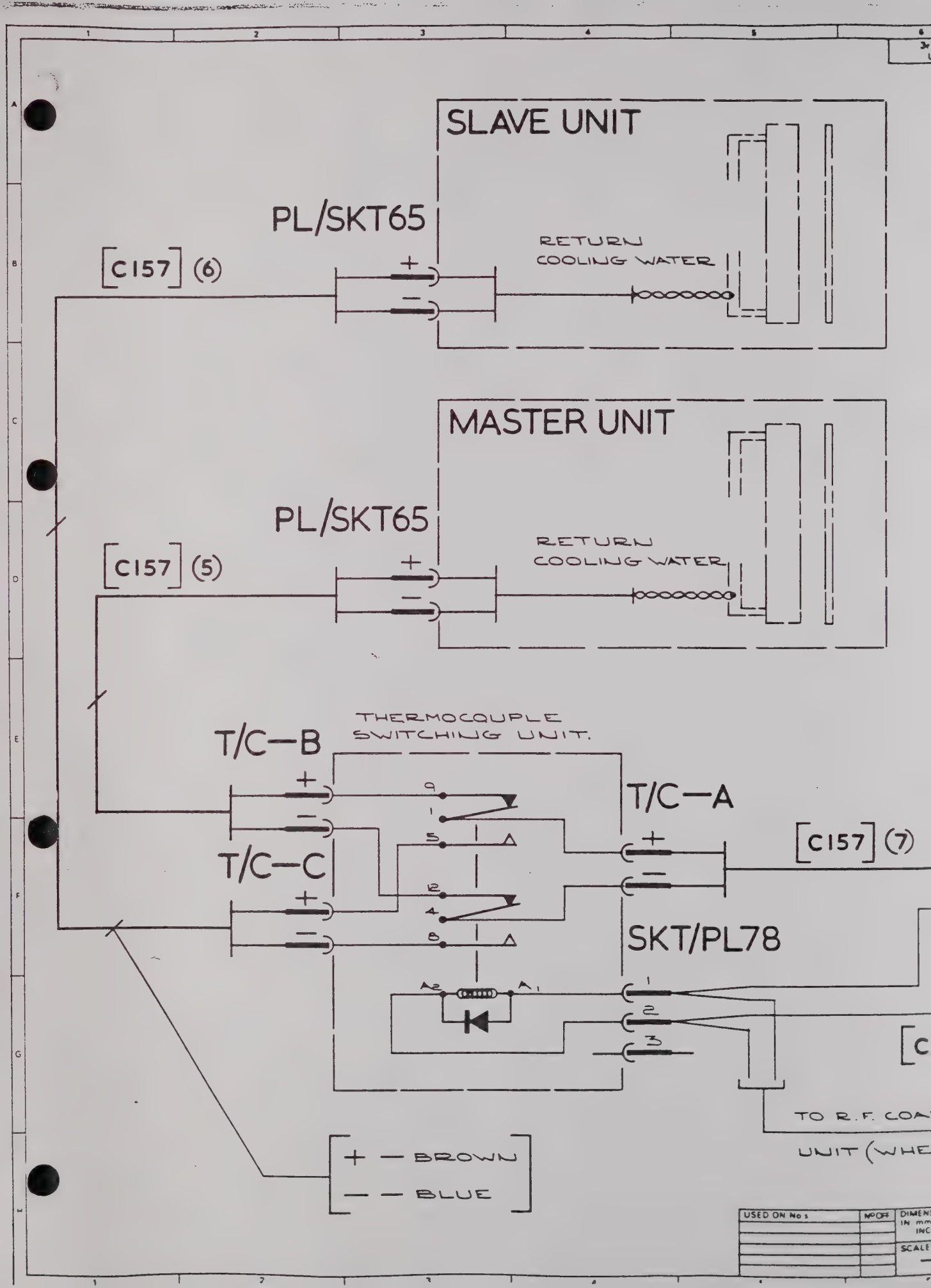
BLUE

1 2 3 4 5 6 7 8 9

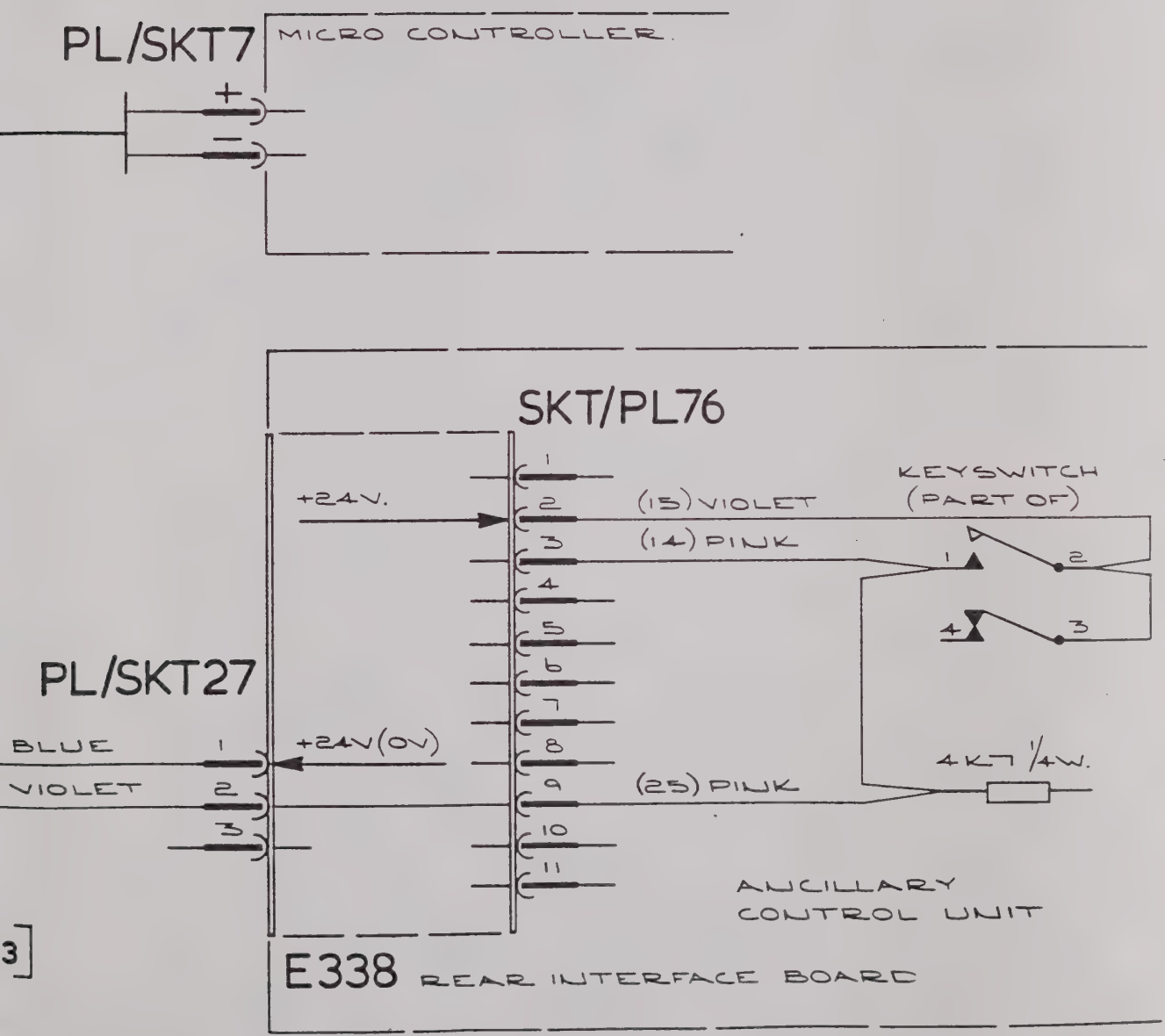
[C157] (3)

9.45

TOLERANCES UNLESS STATED OTHERWISE	MATERIAL		PLASMA TECHNOLOGY (UK) LTD.			
MACHINING ±	MACHINED FINISH ✓	TREATMENT	TITLE D.P. SYSTEM. TEMP. CONTROL WIRING DIAGRAM MASTER ONLY.	DRN DUHAM	DATE 7/2/87	MACHINE TYPE 80 MICRO
SHEET METAL ±	REMOVE SHARP EDGES	FINISH		CHECKED	APPROVED	DRAWING No E347B.
HOLE POS'NS ±						
ANGLES ± 1/2°						


SLAVE UNIT
PL/SKT65
RETURN COOLING WATER
C157 (6)
MASTER UNIT
PL/SKT65
RETURN COOLING WATER
C157 (5)
THERMOCOUPLE SWITCHING UNIT.
T/C—B
T/C—A
T/C—C
C157 (7)
SKT/PL78
A2
A1
1
2
3
9
1
5
12
4
8
+ — BROWN
— — BLUE
TO R.F. COA
UNIT (WHE
USED ON No s
No OFF
DIMEN IN mm INC
SCALE

GLE PROJECTION SS STATED	IF IN DOUBT ASK	THIS DRAWING IS COPYRIGHT IT MUST NOT BE REPRODUCED COPIED OR MODIFIED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF THE COMPANY	ISS	MODIFICATIONS	DRN / DATE
			-	INITIAL ISSUE	DLHAM 11-2-87



3]

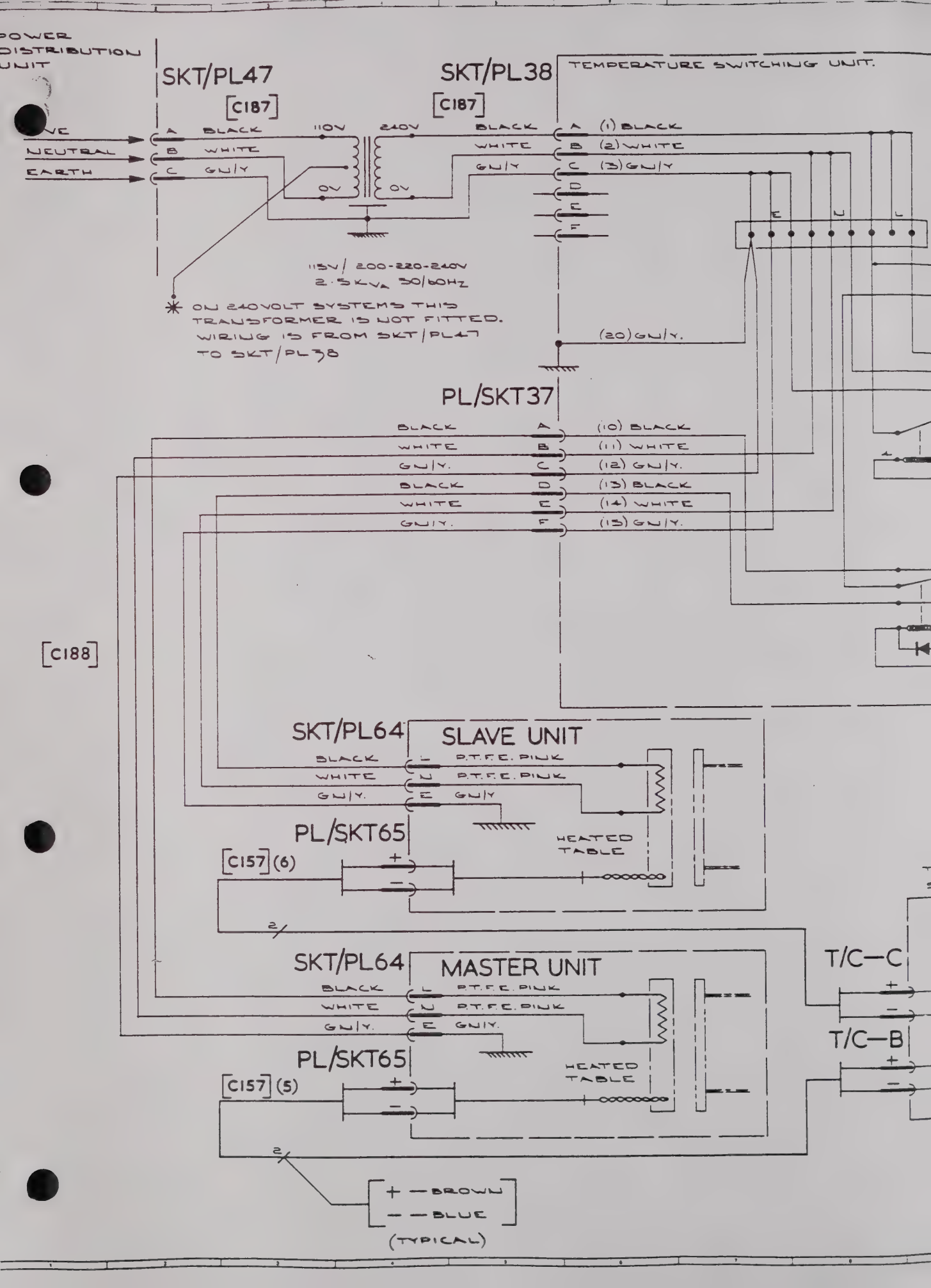
SWITCHING

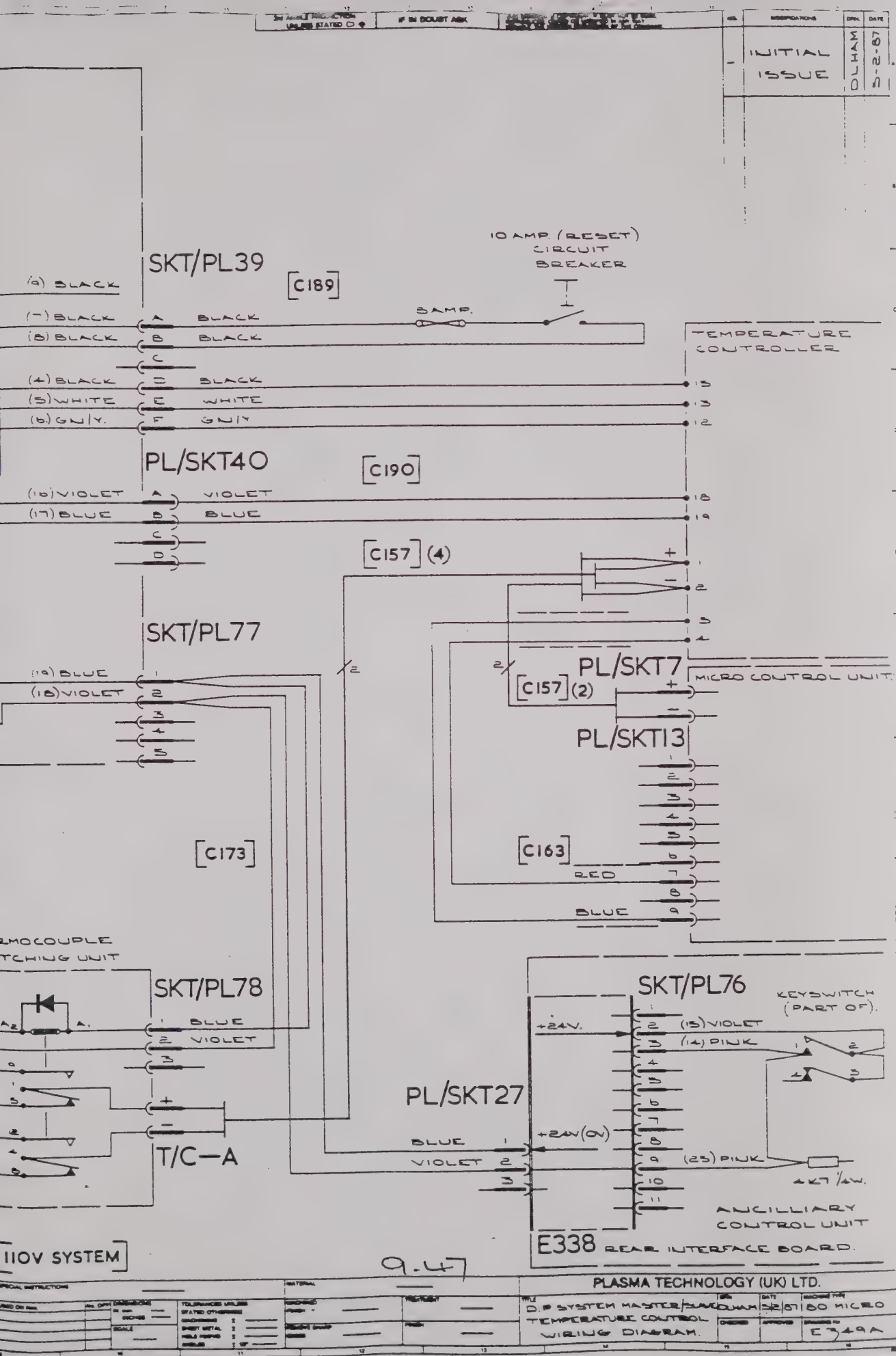
FITTED).

9-46

TOLERANCES UNLESS STATED OTHERWISE: MACHINING ±, SHEET METAL ±, HOLE POSITNS ±, ANGLES ± ½°	MATERIAL		PLASMA TECHNOLOGY (UK) LTD.			
	MACHINED FINISH ✓	TREATMENT	TITLE WIRING DIAGRAM T/C SWITCHING MASTER-RIE SLAVE-RIE	DRN DLHAM	DATE 11/2/87	MACHINE TYPE 80 MICRO
	REMOVE SHARP EDGES	FINISH		CHECKED	APPROVED	DRAWING No E348B

9-46


POWER DISTRIBUTION UNIT
SKT/PL47
[C187]
SKT/PL38
[C187]
TEMPERATURE SWITCHING UNIT.
LIVE
NEUTRAL
EARTH
A BLACK
B WHITE
C GN/Y
110V
240V
0V
0V
BLACK
WHITE
GN/Y
(1) BLACK
(2) WHITE
(3) GN/Y
D
E
F
115V/ 200-220-240V
2.5KVA 50/60HZ
* ON 240VOLT SYSTEMS THIS TRANSFORMER IS NOT FITTED. WIRING IS FROM SKT/PL47 TO SKT/PL38
(20) GN/Y.
PL/SKT37
BLACK A (10) BLACK
WHITE B (11) WHITE
GN/Y. C (12) GN/Y.
BLACK D (13) BLACK
WHITE E (14) WHITE
GN/Y. F (15) GN/Y.
[C188]
SKT/PL64
SLAVE UNIT
BLACK L P.T.F.E. PINK
WHITE N P.T.F.E. PINK
GN/Y. E GN/Y
PL/SKT65
HEATED TABLE
[C157] (6)
+
−
2/
SKT/PL64
MASTER UNIT
BLACK L P.T.F.E. PINK
WHITE N P.T.F.E. PINK
GN/Y. E GN/Y.
PL/SKT65
HEATED TABLE
[C157] (5)
+
−
2/
T/C—C
T/C—B
+ — BROWN
− — BLUE
(TYPICAL)


INITIAL ISSUE
DLHAM 5-2-87
10 AMP. (RESET) CIRCUIT BREAKER
SKT/PL39
[C189]
(a) BLACK
(-) BLACK
(b) BLACK
5AMP.
TEMPERATURE CONTROLLER
(4) BLACK
(5) WHITE
(6) GN/Y.
PL/SKT40
[C190]
(16) VIOLET
(17) BLUE
[C157] (4)
SKT/PL77
(19) BLUE
(18) VIOLET
PL/SKT7
[C157] (2)
MICRO CONTROL UNIT.
PL/SKT13
[C173]
[C163]
RED
BLUE
THERMOCOUPLE SWITCHING UNIT
SKT/PL78
SKT/PL76
KEYSWITCH (PART OF).
+24V.
(15) VIOLET
(14) PINK
PL/SKT27
+24V(0V)
(25) PINK
4K7 ¼W.
T/C—A
ANCILLIARY CONTROL UNIT
E338 REAR INTERFACE BOARD.
110V SYSTEM
9.47
PLASMA TECHNOLOGY (UK) LTD.
D.P SYSTEM MASTER/SLAVE TEMPERATURE CONTROL WIRING DIAGRAM.
DWN 3/2/87
80 MICRO
E7349A

POWER DISTRIBUTION UNIT.

SKT/PL47 [C187]

LIVE
NEUTRAL
EARTH
A BLACK
B WHITE
C GN/Y.
110V
240V
0V
115V/200-220-240V.
2·5 KV$_A$ 50/60 Hz

SKT/PL38 [C187]

TEMPERATURE SWITCHING UNIT.

BLACK A (1) BLACK
WHITE B (2) WHITE
GN/Y C (3) GN/Y
D (4) BLACK
E (5) WHITE
F (6) GN/Y
(7) GN/Y

* ON 240VOLT SYSTEMS THIS TRANSFORMER IS NOT FITTED. WIRING IS FROM:- SKT/PL47 TO SKT/PL38

[C187]

SKT/PL64 D.P. SYSTEM

BLACK L P.T.F.E. PINK
WHITE N P.T.F.E. PINK
GN/Y. E GN/Y

HEATED TABLE
TABLE LEG

PL/SKT65

[C157] (3)
[C157] (6)

T/C—B
T/C—C

+ — BROWN
— — BLUE

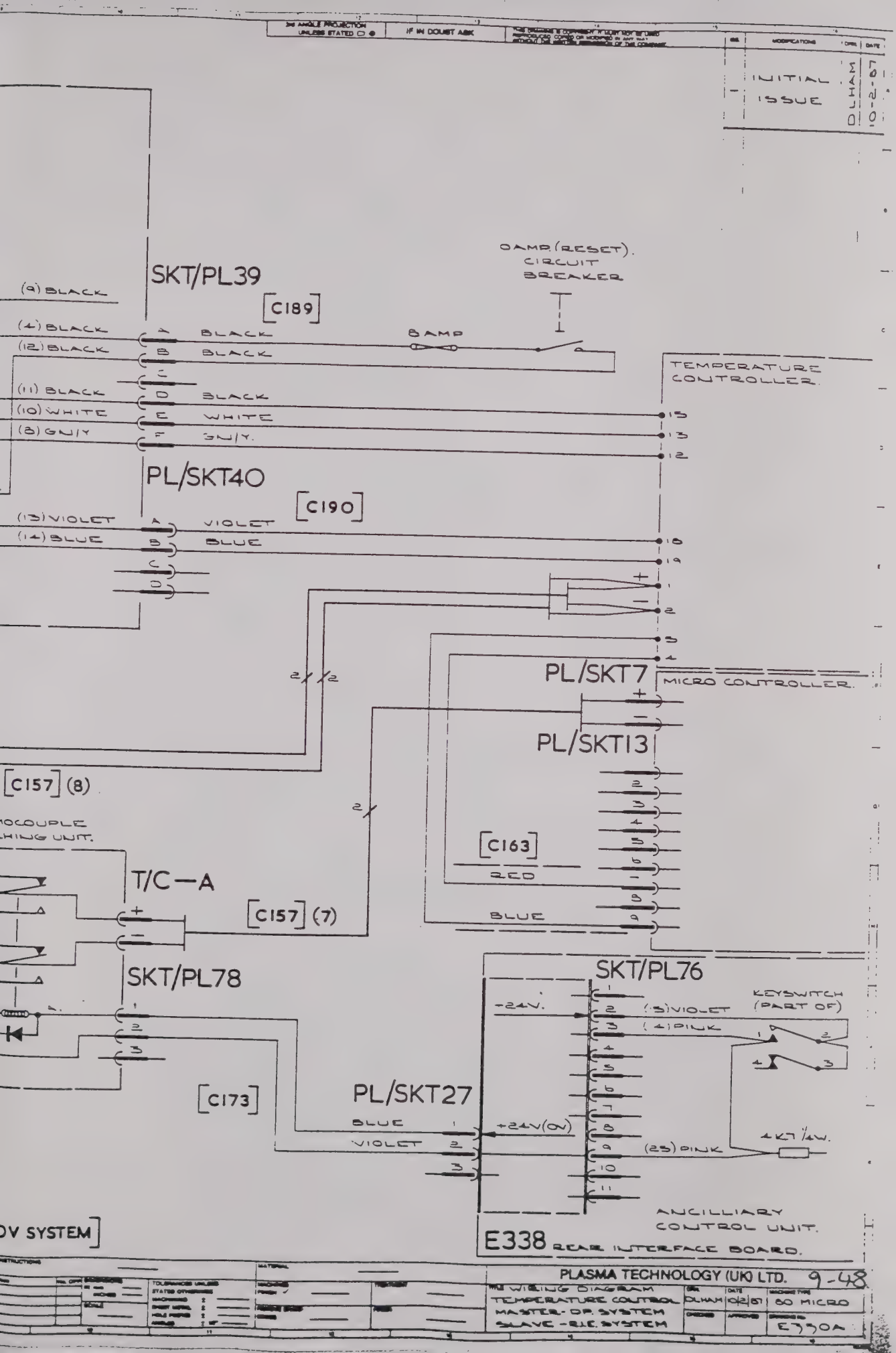
R.I.E. SYSTEM

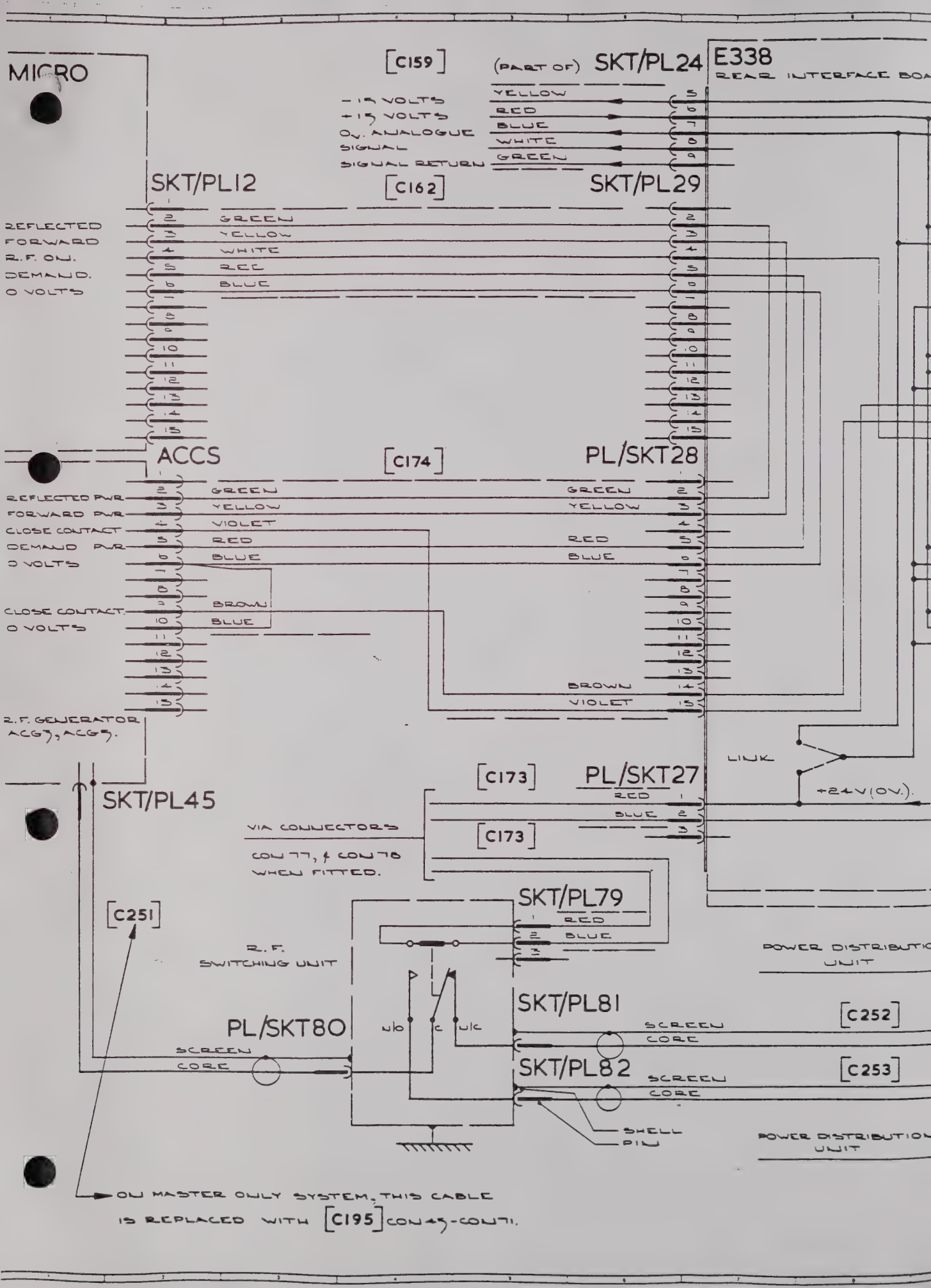
PL/SKT65

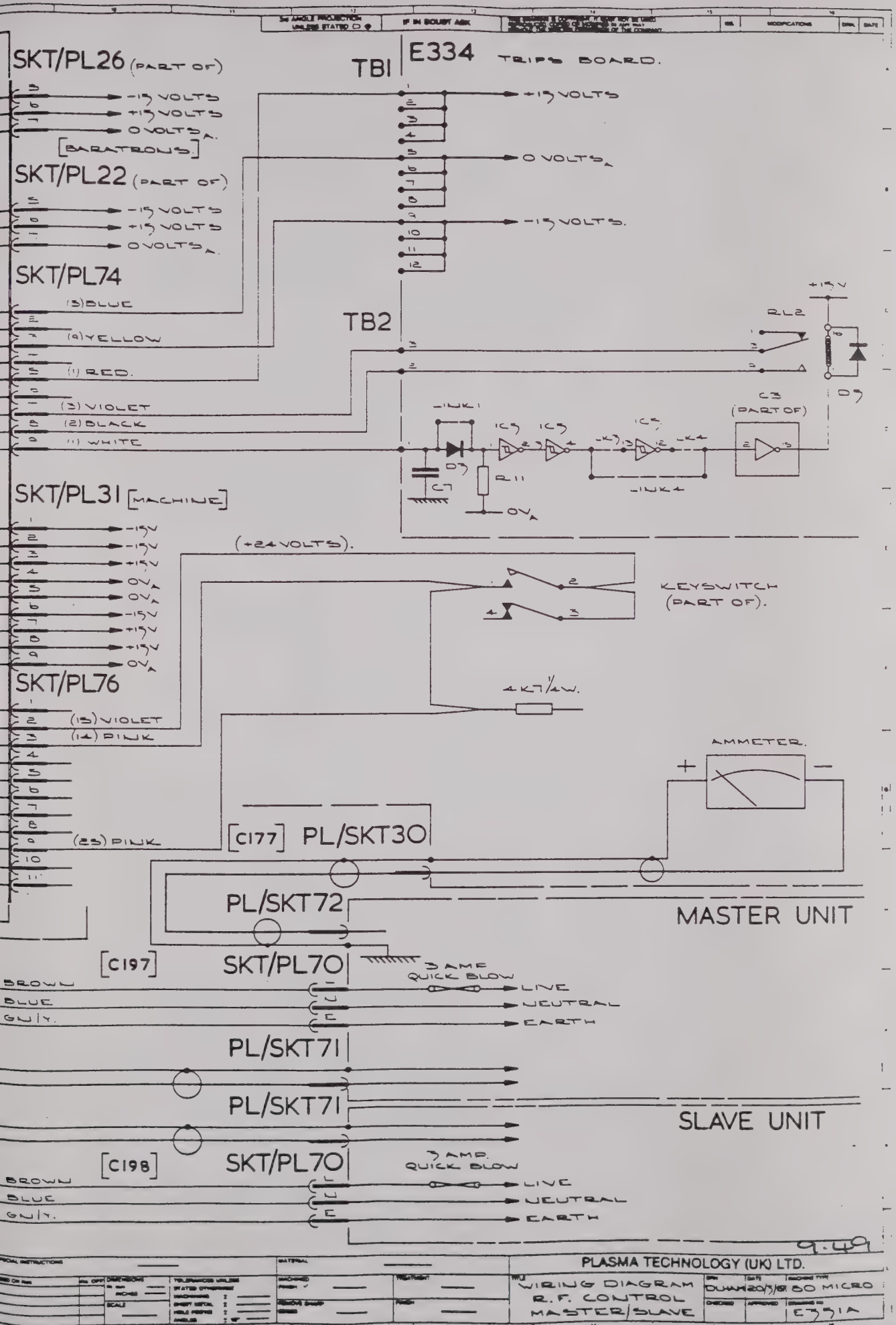
RETURN COOLING WATER.

[C157] (3) CHANGED FOR [C157] (10)
[C157] (6) CHANGED FOR [C157] (9)

SYSTEM WIRING SHOWS MASTER AS A D.P. SYSTEM, AND SLAVE AS AN R.I.E SYSTEM.
IF MASTER IS R.I.E., AND SLAVE D.P. THEN THESE TWO CONNECTORS (T/C-B & T/C-C) ARE CHANGED AROUND.


INITIAL ISSUE
D.LHAM 10-2-87
SKT/PL39
[C189]
(9) BLACK
(4) BLACK
(12) BLACK
(11) BLACK
(10) WHITE
(8) GN/Y
A BLACK
B BLACK
D BLACK
E WHITE
F GN/Y.
8AMP
8AMP (RESET) CIRCUIT BREAKER
TEMPERATURE CONTROLLER.
15
13
12
PL/SKT40
[C190]
(13) VIOLET
(14) BLUE
A VIOLET
B BLUE
C
D
16
19
2/2
PL/SKT7
MICRO CONTROLLER.
PL/SKT13
[C157] (8)
2
[C163]
RED
BLUE
[C157] (7)
T/C—A
SKT/PL78
[C173]
PL/SKT27
BLUE
VIOLET
+24V(0V)
SKT/PL76
-24V.
(3) VIOLET
(4) PINK
(25) PINK
KEYSWITCH (PART OF)
4K7 ¼W.
ANCILLIARY CONTROL UNIT.
E338 REAR INTERFACE BOARD.
OV SYSTEM]
PLASMA TECHNOLOGY (UK) LTD. 9-48
WIRING DIAGRAM
TEMPERATURE CONTROL
MASTER - D.P. SYSTEM
SLAVE - R.I.E. SYSTEM
DLHAM
02/87
60 MICRO
E7304


MICRO
[C159]
(PART OF) SKT/PL24
E338
REAR INTERFACE BOA
- 15 VOLTS
+ 15 VOLTS
0V. ANALOGUE SIGNAL
SIGNAL RETURN
YELLOW
RED
BLUE
WHITE
GREEN
SKT/PL12
[C162]
SKT/PL29
REFLECTED FORWARD R.F. ON. DEMAND. 0 VOLTS
GREEN
YELLOW
WHITE
RED
BLUE
ACCS
[C174]
PL/SKT28
REFLECTED PWR
FORWARD PWR
CLOSE CONTACT DEMAND PWR
0 VOLTS
GREEN
YELLOW
VIOLET
RED
BLUE
CLOSE CONTACT. 0 VOLTS
BROWN
BLUE
BROWN
VIOLET
R.F. GENERATOR AC67, AC67.
LINK
+24V (0V.)
[C173]
PL/SKT27
RED
BLUE
SKT/PL45
VIA CONNECTORS
CON77, & CON78 WHEN FITTED.
[C173]
SKT/PL79
RED
BLUE
[C251]
R.F. SWITCHING UNIT
POWER DISTRIBUTIO UNIT
SKT/PL81
[C252]
PL/SKT80
n/o
c
n/c
SCREEN
CORE
SCREEN
CORE
SKT/PL82
[C253]
SCREEN
CORE
SHELL
PIN
POWER DISTRIBUTION UNIT
ON MASTER ONLY SYSTEM, THIS CABLE IS REPLACED WITH [C195] CON45-CON71.



9.49

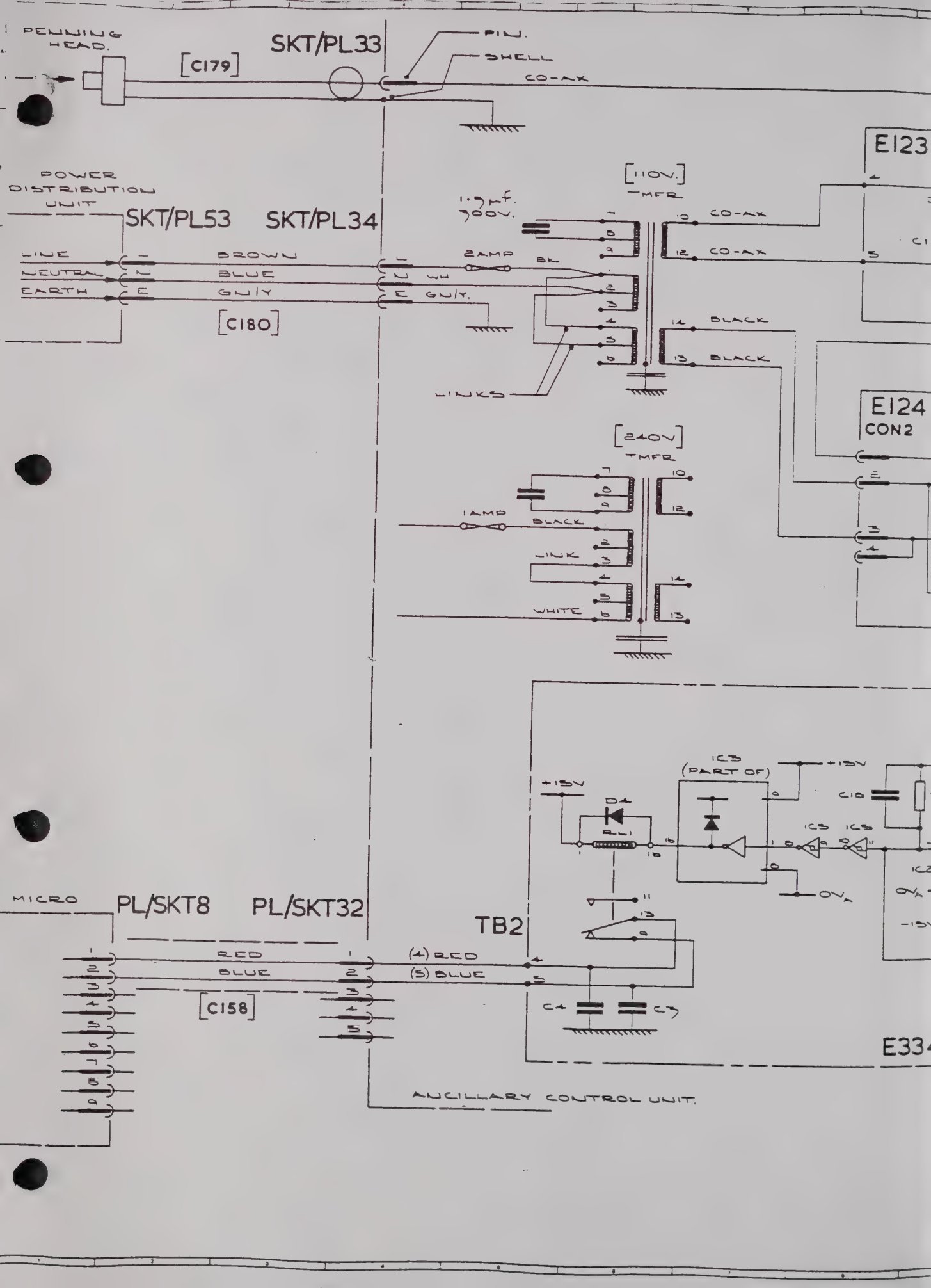
PLASMA TECHNOLOGY (UK) LTD.

WIRING DIAGRAM R.F. CONTROL MASTER/SLAVE

DWN 20/3/85 80 MICRO

E7391A

9.49


PENNING HEAD.
[C179]
SKT/PL33
PIN.
SHELL
CO-AX
E123
POWER DISTRIBUTION UNIT
SKT/PL53
SKT/PL34
LINE
NEUTRAL
EARTH
BROWN
BLUE
GN/Y
GN/Y.
[C180]
[110V.] TMFR
1.7mf. 700V.
2AMP
BK
WH
CO-AX
CO-AX
BLACK
BLACK
LINKS
E124
CON2
[240V] TMFR
1AMP
BLACK
LINK
WHITE
+15V
D4
PL1
IC3 (PART OF)
C10
IC5
IC5
0V
MICRO
PL/SKT8
PL/SKT32
TB2
RED
BLUE
(4) RED
(5) BLUE
[C158]
C4
C7
E33
ANCILLARY CONTROL UNIT.

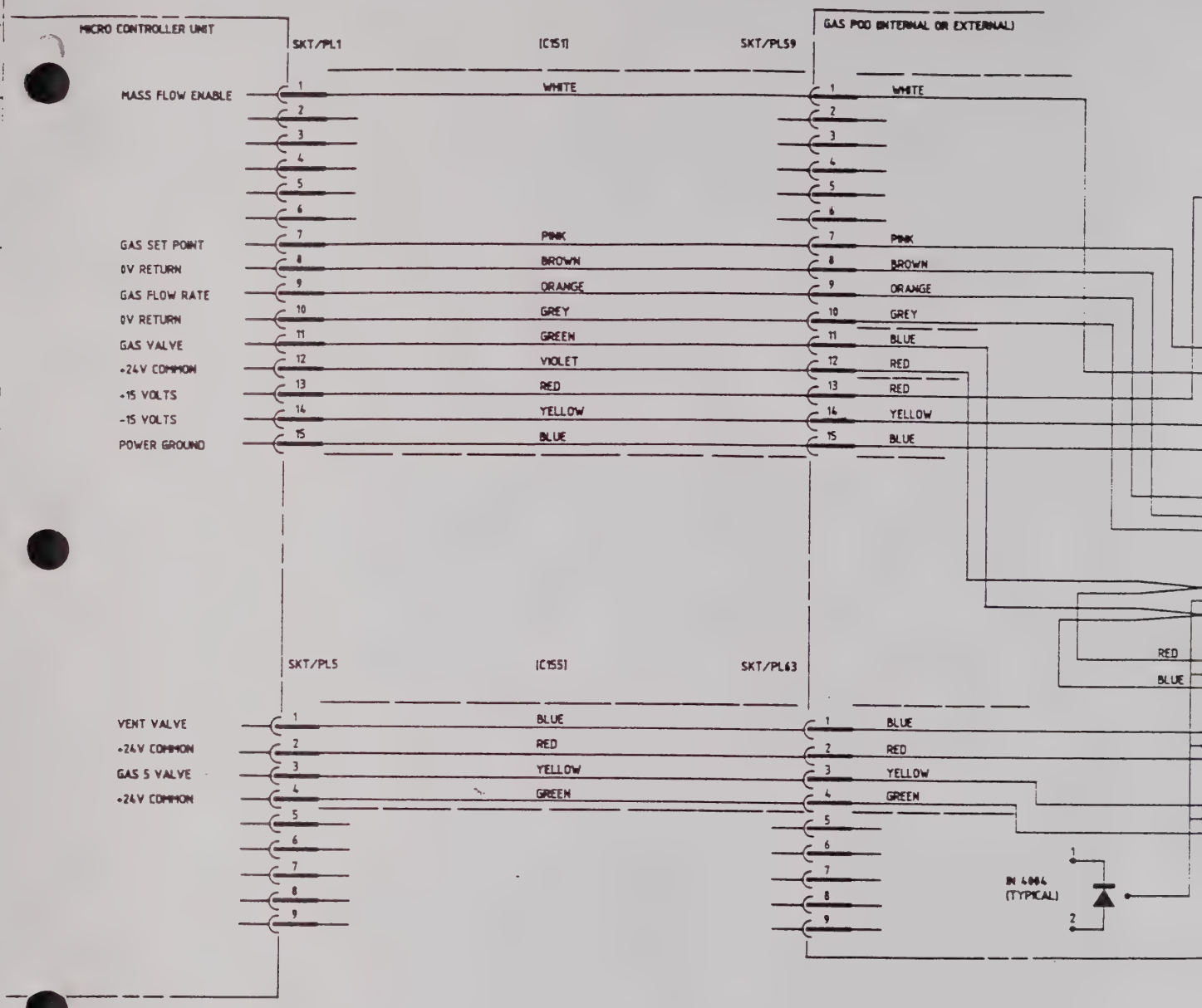
9.50

PLASMA TECHNOLOGY (UK) LTD.

WIRING DIAGRAM PENNING GAUGE UNIT CONTROL

DRAWING TYPE: 80 MICRO

DRAWING NO: E3352A



NOTES

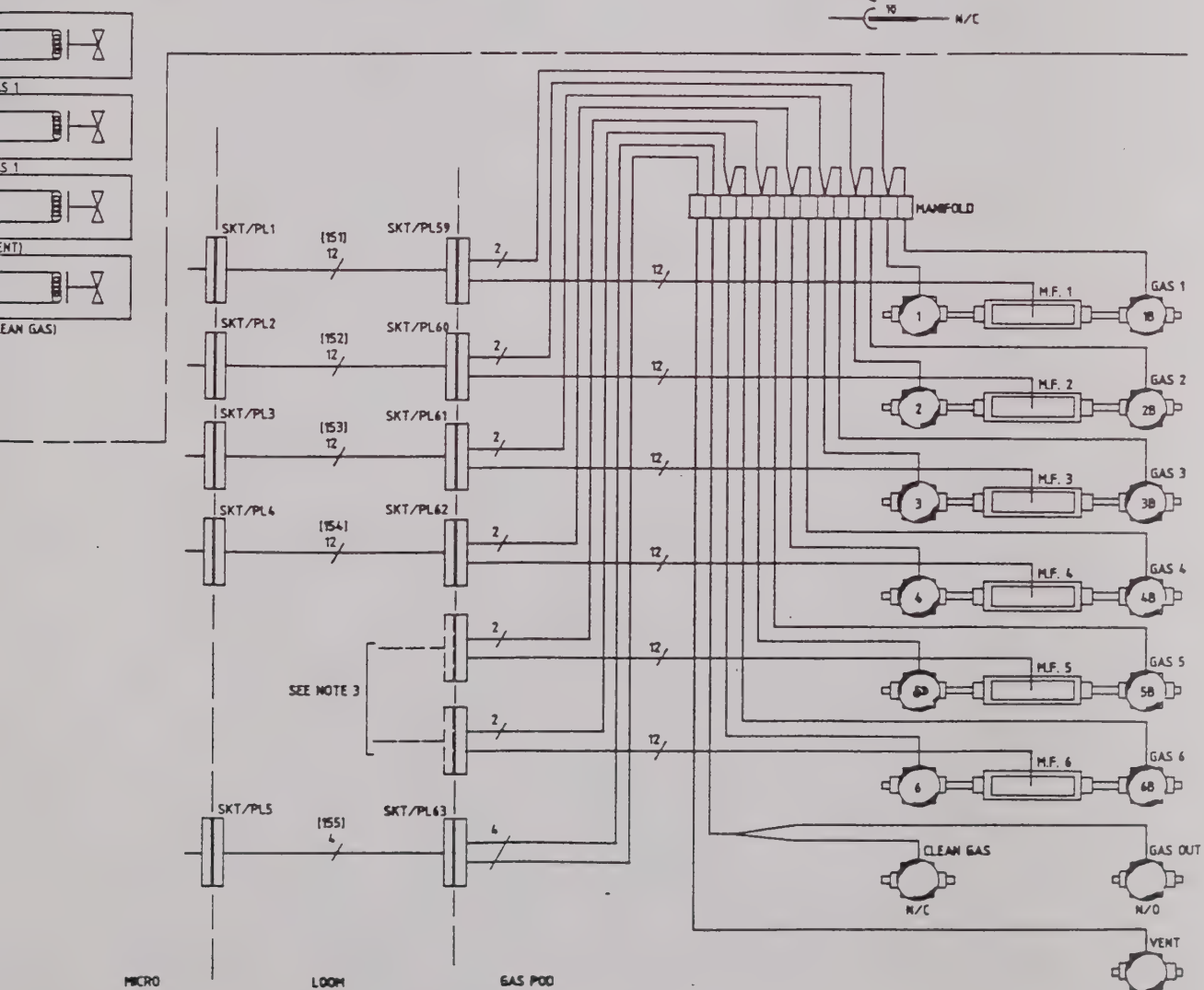
1. WIRING IS SHOWN FOR ONE GAS LINE, GAS LINES 2, 3, AND 4 IN LOOM ARE ALL WIRED SIMILAR.
2. WIRING IN GAS POD IS SIMILAR FOR A MAXIMUM OF 6 PROCESS GASES.
3. GASES 5 AND 6 ARE CONTROLLED EITHER FROM ANY OF GAS 1, 2, 3, AND 4 LINES BY REMOVING CONNECTORS 59, 60, 61, AND 62 AND FITTING INTO POSITIONS AT GAS POD END.
4. RIE SYSTEMS ARE FITTED WITH A MAXIMUM OF 6 PROCESS GASES ONLY.
5. DP SYSTEMS ARE FITTED WITH A MAXIMUM OF 6 PROCESS GASES AND A CLEAN GAS WHICH IS CONTROLLED BY A ROTOMETER ON THE SIDE OF THE GAS POD.

MASS FLOW CONTROLLER
ULTRAFLO UC SERIES

YELLOW	1	-15 VOLTS
RED	2	+15 VOLTS
	3	
	4	CASE GROUND
	5	DC VALVE RETURN (FV)
BLUE	6	POWER GROUND
	7	
PINK	8	0—5V DC IN
WHITE	9	POSITIVE SHUT OFF (HI)
	10	EXT ZERO
	11	POSITIVE SHUT OFF (LO)
	12	
	13	POWER GROUND
ORANGE	14	0—5V DC OUT
BROWN / GREY	15	SIGNAL GROUND

MASS FLOW CONTROLLER
TYLAN

PINK	A	CONTROL SET POINT
GREY	B	POWER 0V. COMMON
	C	COMMON (NOT USED)
	D	N/C
	E	N/C
YELLOW	F	-15 VOLTS
	H	KEYING PLUG
	J	N/C
	K	N/C
	L	N/C
	1	GROUND (CHASSIS)
BROWN	2	SIGNAL 0V.
ORANGE	3	OUTPUT 0—5V DC
RED	4	+15 VOLTS
	5	N/C
	6	N/C
	7	KEYING PLUG
	8	N/C
	9	N/C
	10	N/C



9.51

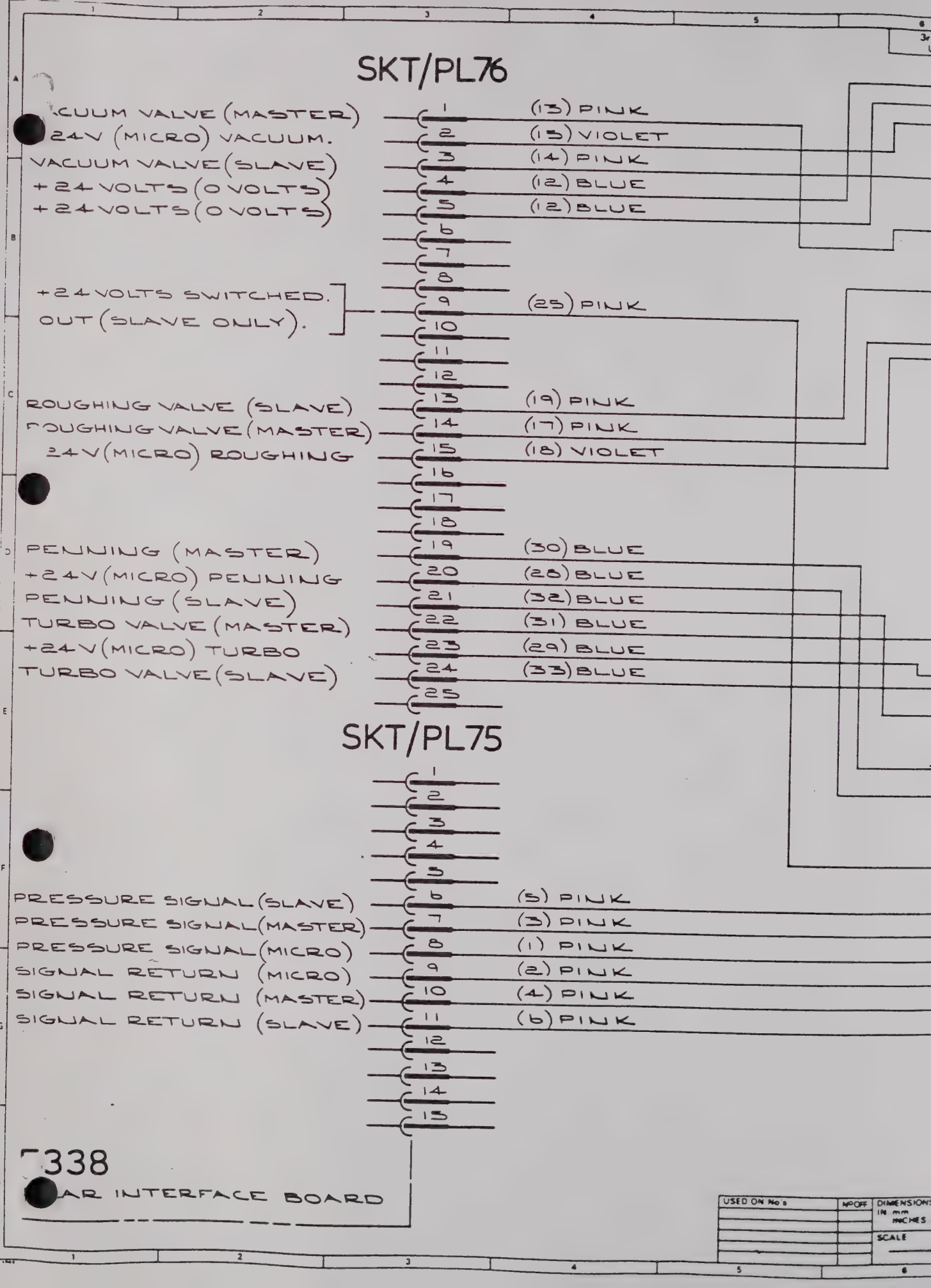
PLASMA TECHNOLOGY (UK) LTD.

WIRING DIAGRAM GAS POD

DWG. NO. 60 MICRO

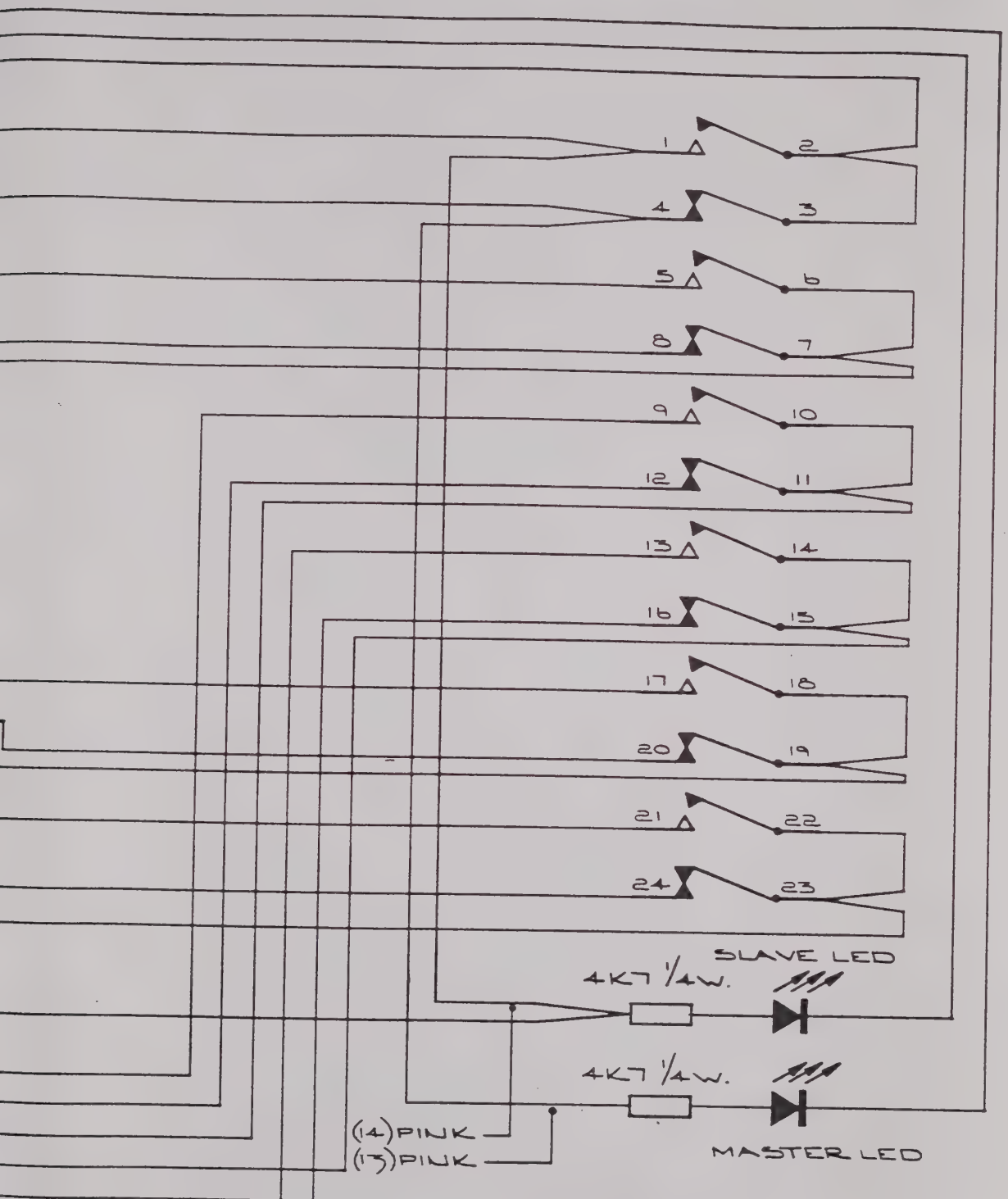
E373A

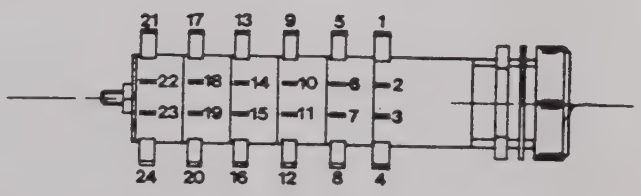
9.51


SKT/PL76
VACUUM VALVE (MASTER)
24V (MICRO) VACUUM.
VACUUM VALVE (SLAVE)
+24 VOLTS (0 VOLTS)
+24 VOLTS (0 VOLTS)
+24 VOLTS SWITCHED.
OUT (SLAVE ONLY).
ROUGHING VALVE (SLAVE)
ROUGHING VALVE (MASTER)
24V (MICRO) ROUGHING
PENNING (MASTER)
+24V (MICRO) PENNING
PENNING (SLAVE)
TURBO VALVE (MASTER)
+24V (MICRO) TURBO
TURBO VALVE (SLAVE)
1 (13) PINK
2 (15) VIOLET
3 (14) PINK
4 (12) BLUE
5 (12) BLUE
6
7
8
9 (25) PINK
10
11
12
13 (19) PINK
14 (17) PINK
15 (18) VIOLET
16
17
18
19 (30) BLUE
20 (28) BLUE
21 (32) BLUE
22 (31) BLUE
23 (29) BLUE
24 (33) BLUE
25
SKT/PL75
1
2
3
4
5
PRESSURE SIGNAL (SLAVE)
PRESSURE SIGNAL (MASTER)
PRESSURE SIGNAL (MICRO)
SIGNAL RETURN (MICRO)
SIGNAL RETURN (MASTER)
SIGNAL RETURN (SLAVE)
6 (5) PINK
7 (3) PINK
8 (1) PINK
9 (2) PINK
10 (4) PINK
11 (6) PINK
12
13
14
15
7338
AR INTERFACE BOARD
USED ON No's
No OFF
DIMENSIONS IN mm INCHES
SCALE

GLE PROJECTION
S STATED
IF IN DOUBT ASK
THIS DRAWING IS COPYRIGHT IT MUST NOT BE REPRODUCED COPIED OR MODIFIED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF THE COMPANY

ISS	MODIFICATIONS	DRN	DATE

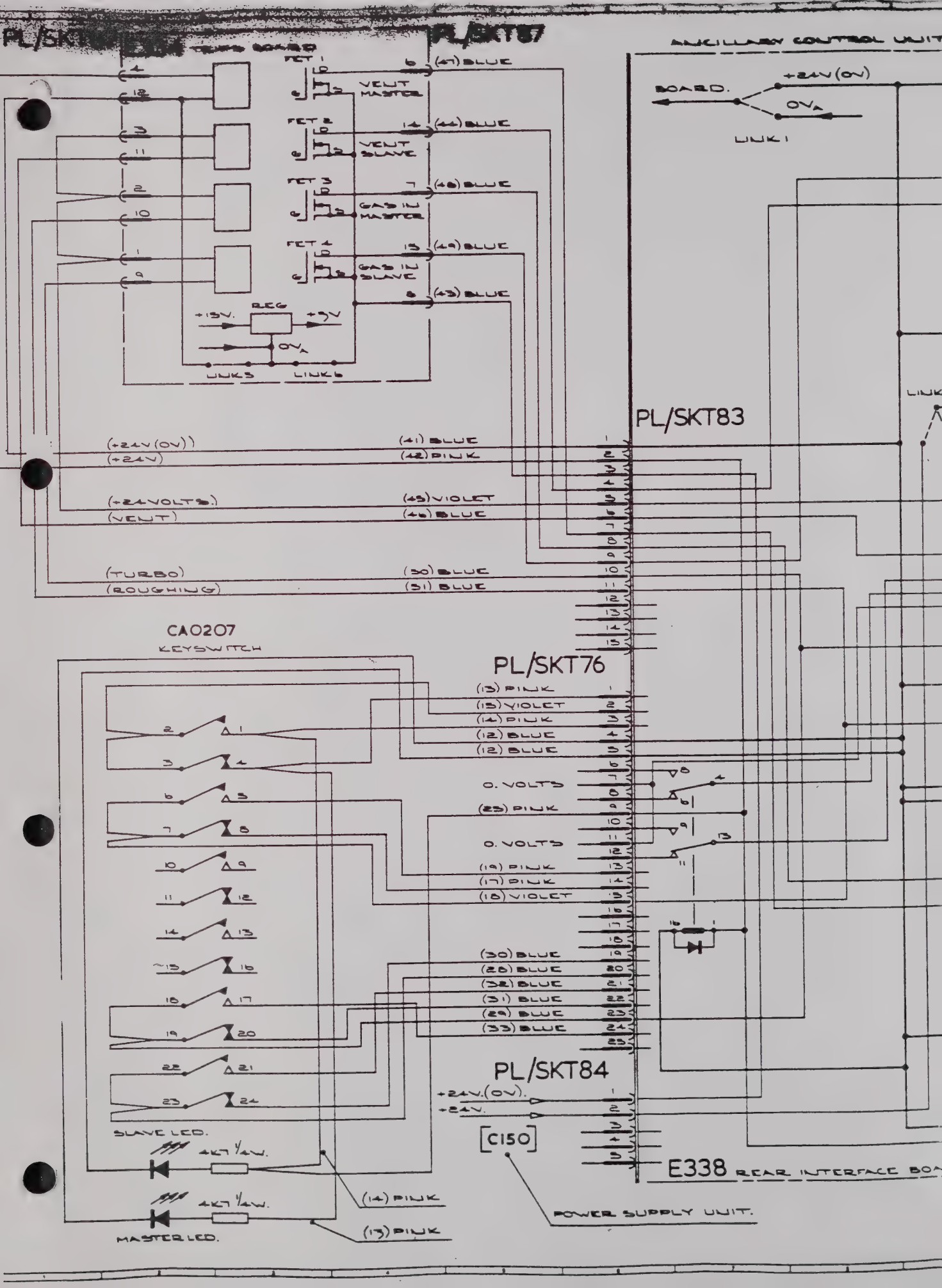


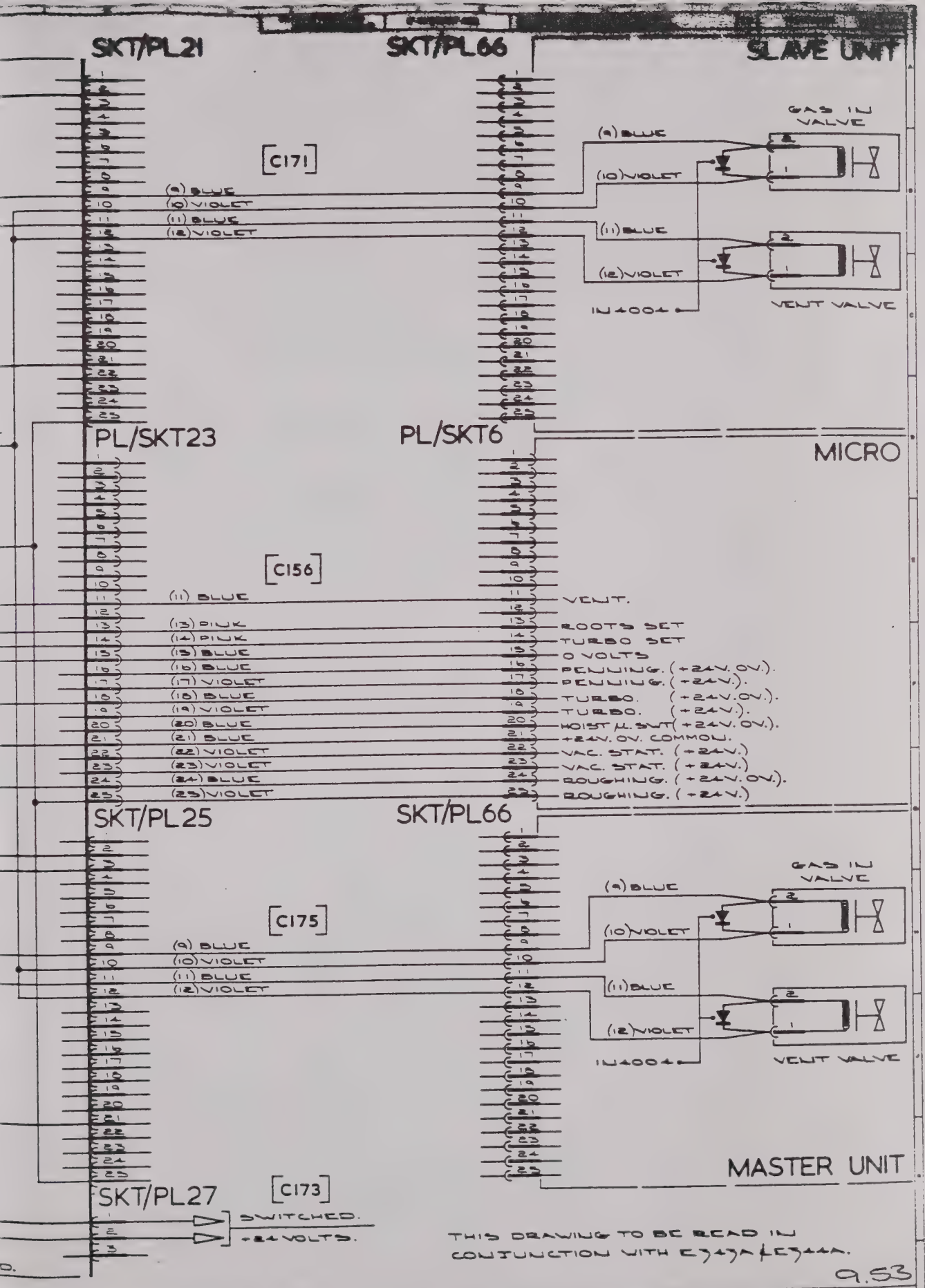


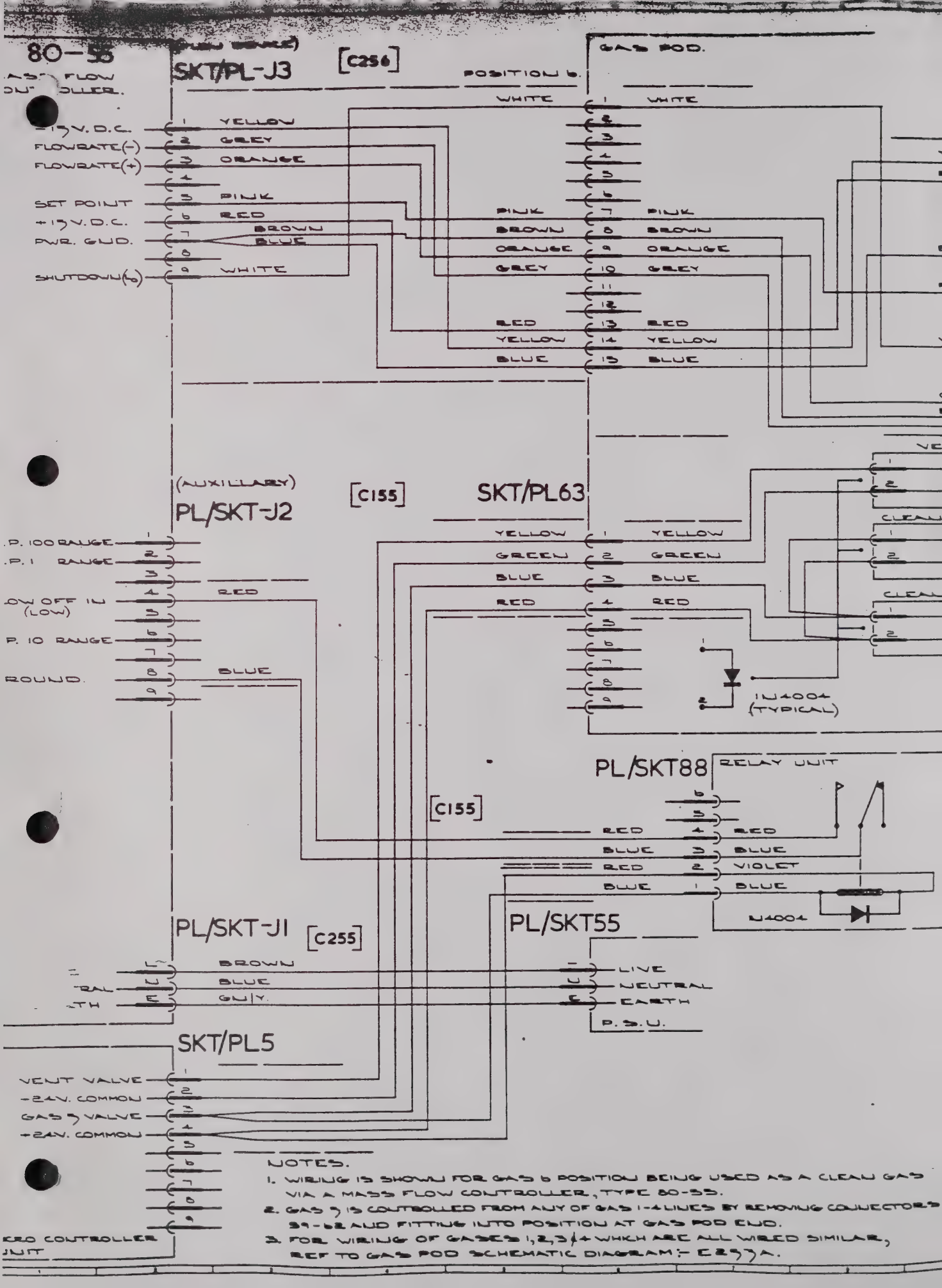
KEYSWITCH

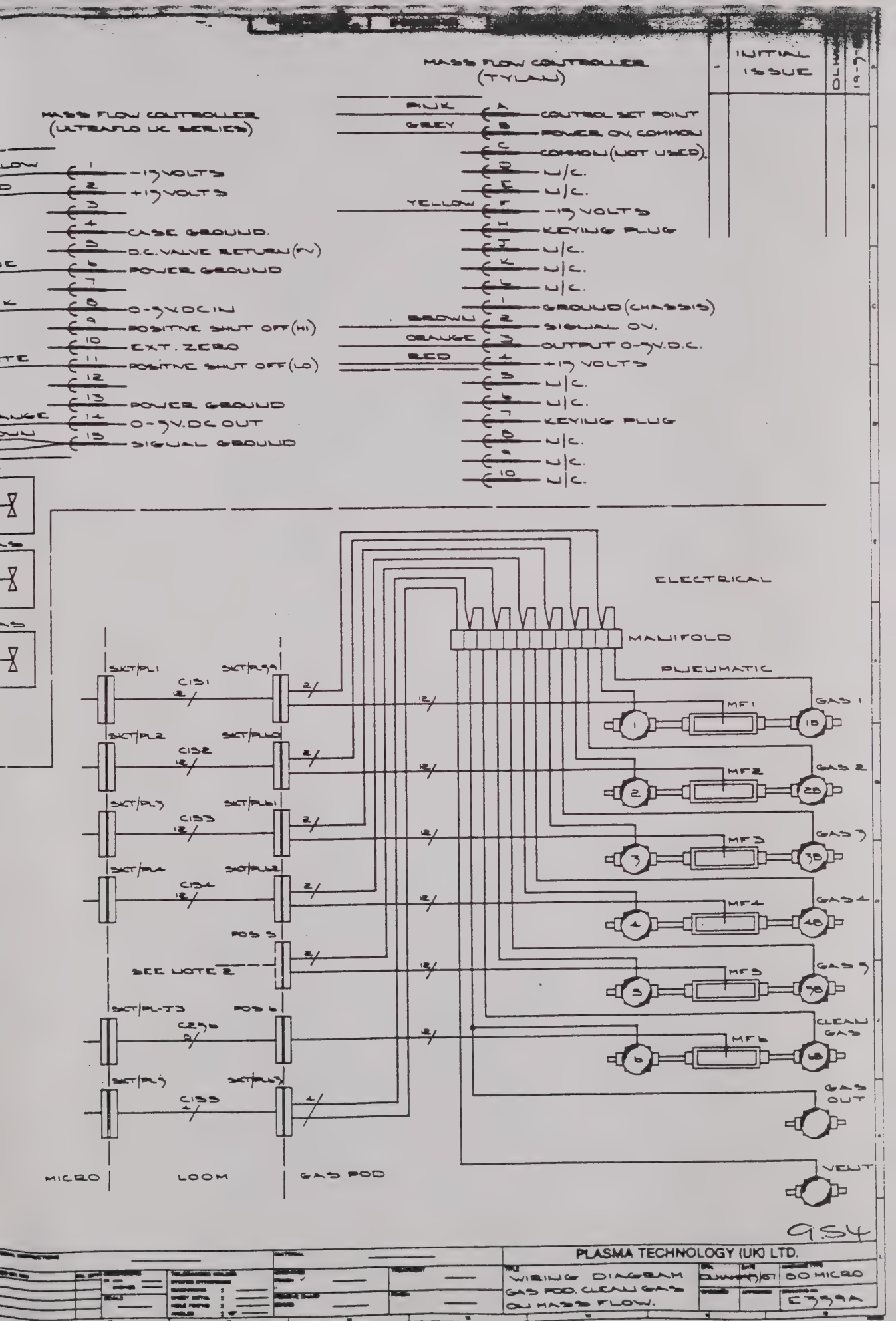
9.52

TOLERANCES UNLESS STATED OTHERWISE MACHINING ± SHEET METAL ± HOLE POSITNS ± ANGLES ± ½°	MATERIAL MACHINED FINISH ✓ REMOVE SHARP EDGES	TREATMENT FINISH	PLASMA TECHNOLOGY (UK) LTD. TITLE: KEYSWITCH WIRING ANCILLARY CONTROL UNIT.	DRN: DUHAM	DATE: 23/11/84	MACHINE TYPE: 80 MICRO DRAWING No: E354B.
				CHECKED	APPROVED	


PL/SKT87
ANCILLARY CONTROL UNIT
BOARD.
+24V (0V)
0V
LINK 1
FET 1
VENT MASTER
FET 2
VENT SLAVE
FET 3
GAS IN MASTER
FET 4
GAS IN SLAVE
(47) BLUE
(44) BLUE
(46) BLUE
(49) BLUE
(43) BLUE
+15V.
REG
+5V
0V
LINK 5
LINK 6
PL/SKT83
(+24V (0V))
(+24V)
(41) BLUE
(42) PINK
(+24 VOLTS.)
(VENT)
(45) VIOLET
(46) BLUE
(TURBO)
(ROUGHING)
(50) BLUE
(51) BLUE
CA0207
KEYSWITCH
PL/SKT76
(13) PINK
(15) VIOLET
(14) PINK
(12) BLUE
(12) BLUE
0. VOLTS
(23) PINK
0. VOLTS
(19) PINK
(17) PINK
(18) VIOLET
(30) BLUE
(28) BLUE
(32) BLUE
(31) BLUE
(29) BLUE
(33) BLUE
PL/SKT84
+24V. (0V).
+24V.
C150
SLAVE LED.
4K7 1/4W.
4K7 1/4W.
MASTER LED.
(14) PINK
(17) PINK
POWER SUPPLY UNIT.
E338 REAR INTERFACE BOA


SKT/PL21
SKT/PL66
SLAVE UNIT
GAS IN VALVE
[C171]
(9) BLUE
(10) VIOLET
(11) BLUE
(12) VIOLET
(9) BLUE
(10) VIOLET
(11) BLUE
(12) VIOLET
IN4004
VENT VALVE
PL/SKT23
PL/SKT6
MICRO
[C156]
(11) BLUE
(13) PINK
(14) PINK
(15) BLUE
(16) BLUE
(17) VIOLET
(18) BLUE
(19) VIOLET
(20) BLUE
(21) BLUE
(22) VIOLET
(23) VIOLET
(24) BLUE
(25) VIOLET
VENT.
ROOTS SET
TURBO SET
0 VOLTS
PENNING. (+24V. 0V.).
PENNING. (+24V.).
TURBO. (+24V. 0V.).
TURBO. (+24V.).
HOIST µ. SWT (+24V. 0V.).
+24V. 0V. COMMON.
VAC. STAT. (+24V.)
VAC. STAT. (+24V.)
ROUGHING. (+24V. 0V.).
ROUGHING. (+24V.)
SKT/PL25
SKT/PL66
GAS IN VALVE
[C175]
(9) BLUE
(10) VIOLET
(11) BLUE
(12) VIOLET
(9) BLUE
(10) VIOLET
(11) BLUE
(12) VIOLET
IN4004
VENT VALVE
MASTER UNIT
SKT/PL27
[C173]
SWITCHED.
+24 VOLTS.
THIS DRAWING TO BE READ IN CONJUNCTION WITH E7474/E7444A.
9.53
PLASMA TECHNOLOGY (UK) LTD.
WIRING DIAGRAM GAS IN/VENT, VALVES MASTER/SLAVE.
80 MICRO
E7377A
9.53


80-55
MASS FLOW CONTROLLER.
SKT/PL-J3
[C256]
GAS POD.
POSITION 6.
+17V. D.C.
FLOWRATE(-)
FLOWRATE(+)
SET POINT
+17V. D.C.
PWR. GND.
SHUTDOWN(6)
YELLOW
GREY
ORANGE
PINK
RED
BROWN
BLUE
WHITE
(AUXILLARY)
PL/SKT-J2
[C155]
SKT/PL63
P. 100 RANGE
P. 1 RANGE
ON OFF IN (LOW)
P. 10 RANGE
GROUND.
IN4004 (TYPICAL)
PL/SKT88
RELAY UNIT
[C155]
VIOLET
IN4004
PL/SKT-J1
[C255]
PL/SKT55
LIVE
NEUTRAL
EARTH
P.S.U.
SKT/PL5
VENT VALVE
-24V. COMMON
GAS 7 VALVE
+24V. COMMON
NOTES.
1. WIRING IS SHOWN FOR GAS 6 POSITION BEING USED AS A CLEAN GAS VIA A MASS FLOW CONTROLLER, TYPE 80-55.
2. GAS 7 IS CONTROLLED FROM ANY OF GAS 1-4 LINES BY REMOVING CONNECTORS 59-62 AND FITTING INTO POSITION AT GAS POD END.
3. FOR WIRING OF GASES 1,2,3 & 4 WHICH ARE ALL WIRED SIMILAR, REF TO GAS POD SCHEMATIC DIAGRAM:- E257A.



954

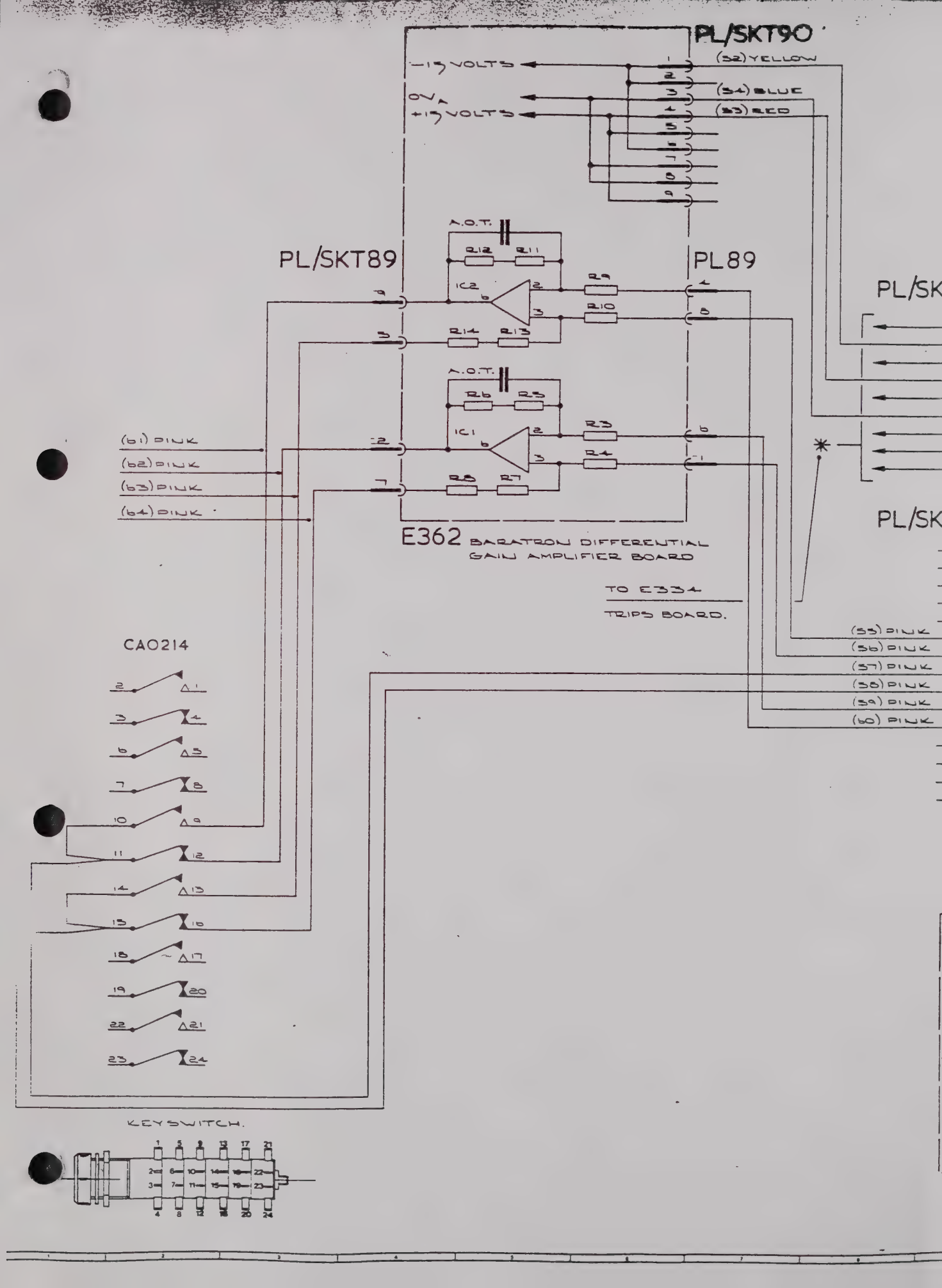
PLASMA TECHNOLOGY (UK) LTD.

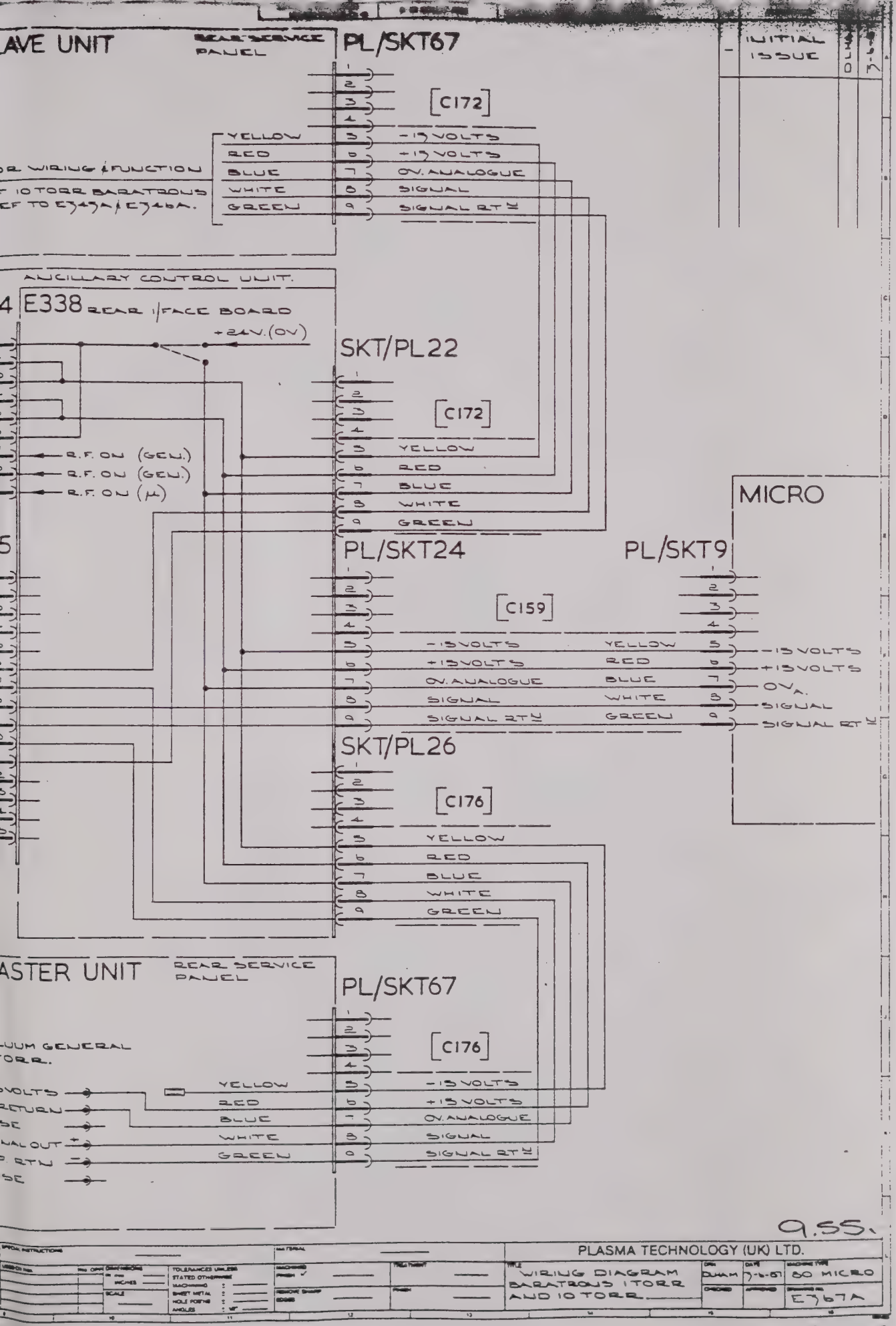
WIRING DIAGRAM GAS POD. CLEAN GAS ON MASS FLOW.

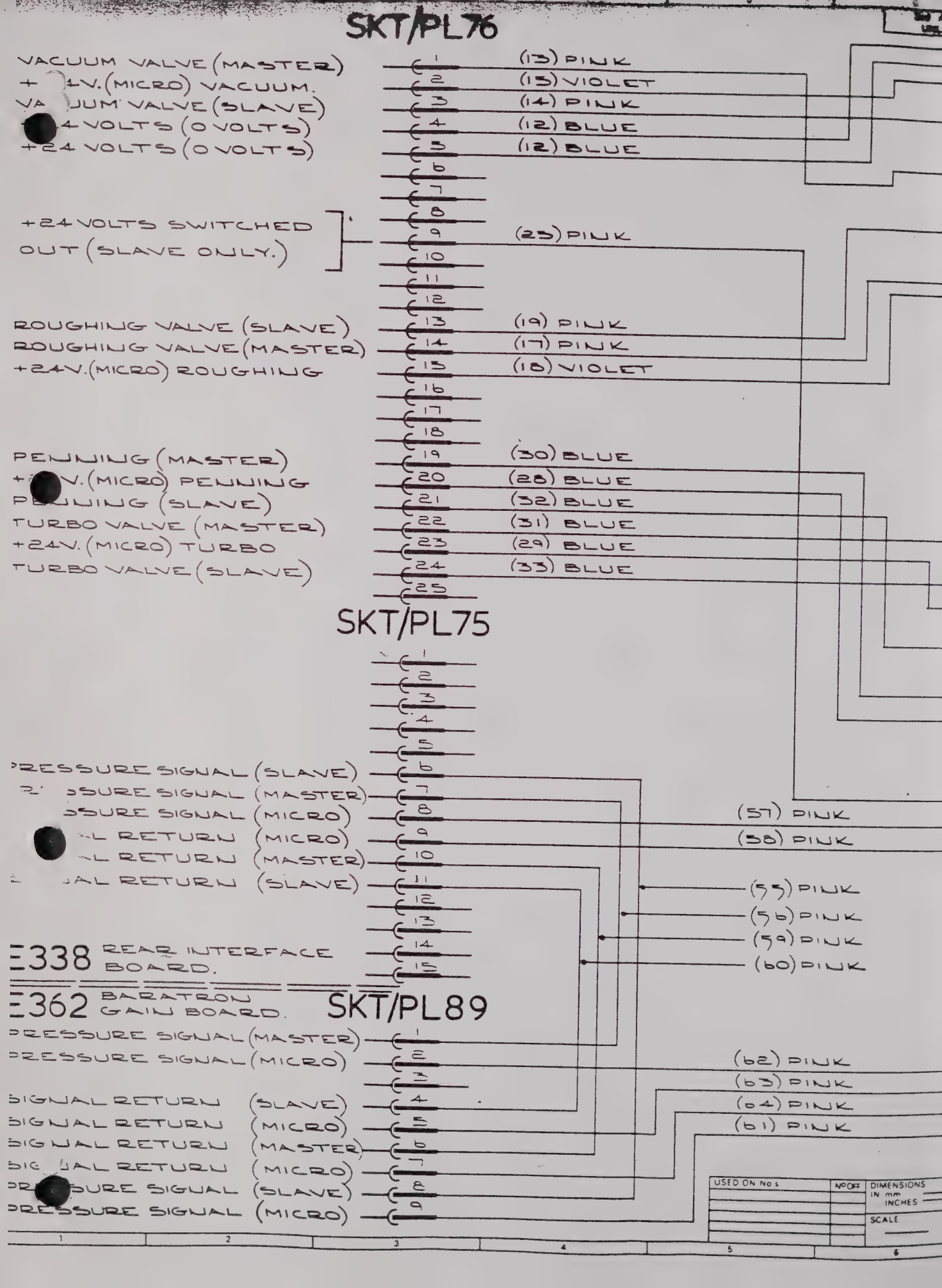
DO MICRO

E7394

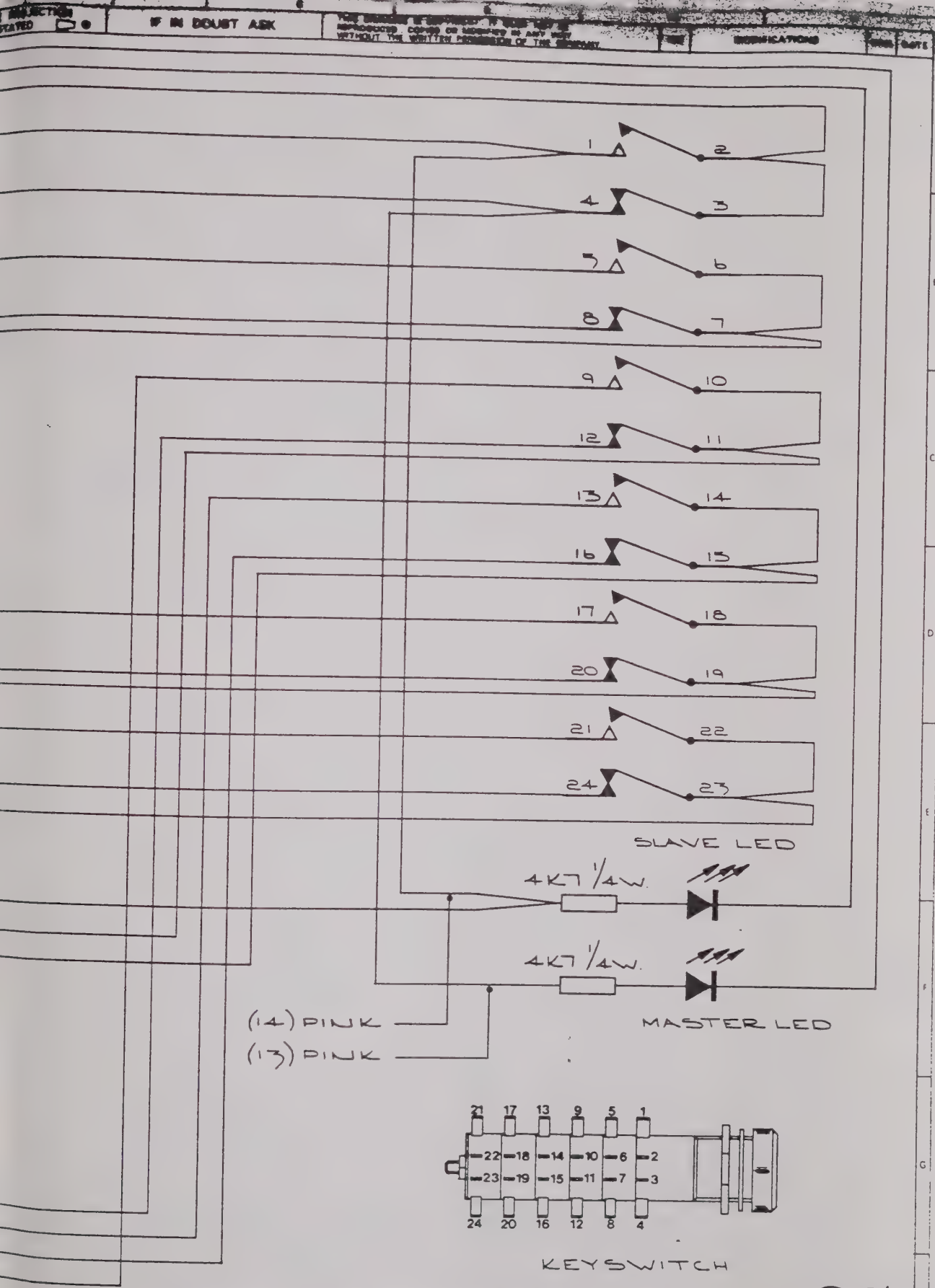
9.54


PL/SKT90
(32) YELLOW
(34) BLUE
(33) RED
-15 VOLTS
0V
+15 VOLTS
PL/SKT89
PL89
A.O.T.
R12
R11
IC2
R9
R10
R14
R13
A.O.T.
R6
R5
IC1
R3
R4
R8
R7
(61) PINK
(62) PINK
(63) PINK
(64) PINK
E362 BARATRON DIFFERENTIAL GAIN AMPLIFIER BOARD
TO E334 TRIPS BOARD.
(55) PINK
(56) PINK
(57) PINK
(58) PINK
(59) PINK
(60) PINK
CA0214
KEYSWITCH.


AVE UNIT
REAR SERVICE PANEL
PL/SKT67
[C172]
YELLOW 3 -15 VOLTS
RED 6 +15 VOLTS
BLUE 7 0V. ANALOGUE
WHITE 8 SIGNAL
GREEN 9 SIGNAL RTN
R WIRING & FUNCTION
10 TORR BARATRON
EF TO E343A/E346A.
INITIAL ISSUE
ANCILLARY CONTROL UNIT.
E338 REAR P/FACE BOARD
+24V.(0V)
SKT/PL22
[C172]
R.F. ON (GEN.)
R.F. ON (GEN.)
R.F. ON (μ)
YELLOW
RED
BLUE
WHITE
GREEN
MICRO
PL/SKT24
PL/SKT9
[C159]
-15 VOLTS YELLOW 5 -15 VOLTS
+15 VOLTS RED 6 +15 VOLTS
0V. ANALOGUE BLUE 7 0V A.
SIGNAL WHITE 8 SIGNAL
SIGNAL RTN GREEN 9 SIGNAL RTN
SKT/PL26
[C176]
YELLOW
RED
BLUE
WHITE
GREEN
ASTER UNIT
REAR SERVICE PANEL
PL/SKT67
[C176]
UUM GENERAL
ORR.
VOLTS
RETURN
SE
NAL OUT +
P. RTN -
SE
YELLOW 5 -15 VOLTS
RED 6 +15 VOLTS
BLUE 7 0V. ANALOGUE
WHITE 8 SIGNAL
GREEN 9 SIGNAL RTN
9.55.
PLASMA TECHNOLOGY (UK) LTD.
WIRING DIAGRAM BARATRON 1TORR AND 10 TORR.
DRWN 7-6-85
80 MICRO
E767A
9-55


SKT/PL76
VACUUM VALVE (MASTER)
+24V. (MICRO) VACUUM.
VACUUM VALVE (SLAVE)
+24 VOLTS (0 VOLTS)
+24 VOLTS (0 VOLTS)
+24 VOLTS SWITCHED OUT (SLAVE ONLY.)
ROUGHING VALVE (SLAVE)
ROUGHING VALVE (MASTER)
+24V. (MICRO) ROUGHING
PENNING (MASTER)
+24V. (MICRO) PENNING
PENNING (SLAVE)
TURBO VALVE (MASTER)
+24V. (MICRO) TURBO
TURBO VALVE (SLAVE)
1 (13) PINK
2 (15) VIOLET
3 (14) PINK
4 (12) BLUE
5 (12) BLUE
6
7
8
9 (25) PINK
10
11
12
13 (19) PINK
14 (17) PINK
15 (18) VIOLET
16
17
18
19 (30) BLUE
20 (28) BLUE
21 (32) BLUE
22 (31) BLUE
23 (29) BLUE
24 (33) BLUE
25
SKT/PL75
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
PRESSURE SIGNAL (SLAVE)
PRESSURE SIGNAL (MASTER)
PRESSURE SIGNAL (MICRO)
SIGNAL RETURN (MICRO)
SIGNAL RETURN (MASTER)
SIGNAL RETURN (SLAVE)
(57) PINK
(58) PINK
(55) PINK
(56) PINK
(59) PINK
(60) PINK
E338 REAR INTERFACE BOARD.
E362 BARATRON GAIN BOARD.
SKT/PL89
PRESSURE SIGNAL (MASTER)
PRESSURE SIGNAL (MICRO)
SIGNAL RETURN (SLAVE)
SIGNAL RETURN (MICRO)
SIGNAL RETURN (MASTER)
SIGNAL RETURN (MICRO)
PRESSURE SIGNAL (SLAVE)
PRESSURE SIGNAL (MICRO)
1
2
3
4
5
6
7
8
9
(62) PINK
(63) PINK
(64) PINK
(61) PINK
USED ON Nos
No Off
DIMENSIONS IN mm INCHES
SCALE

IF IN DOUBT ASK

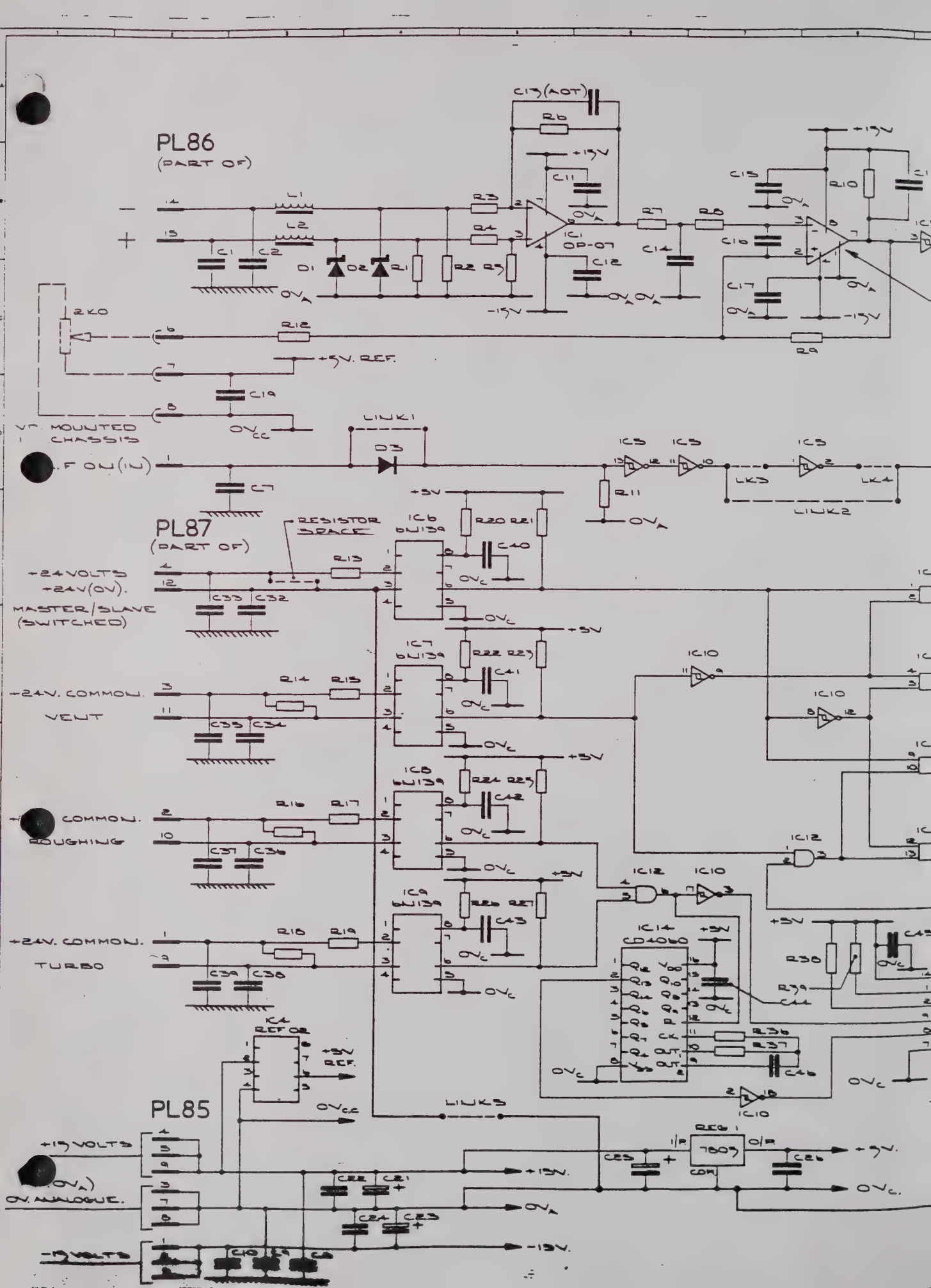


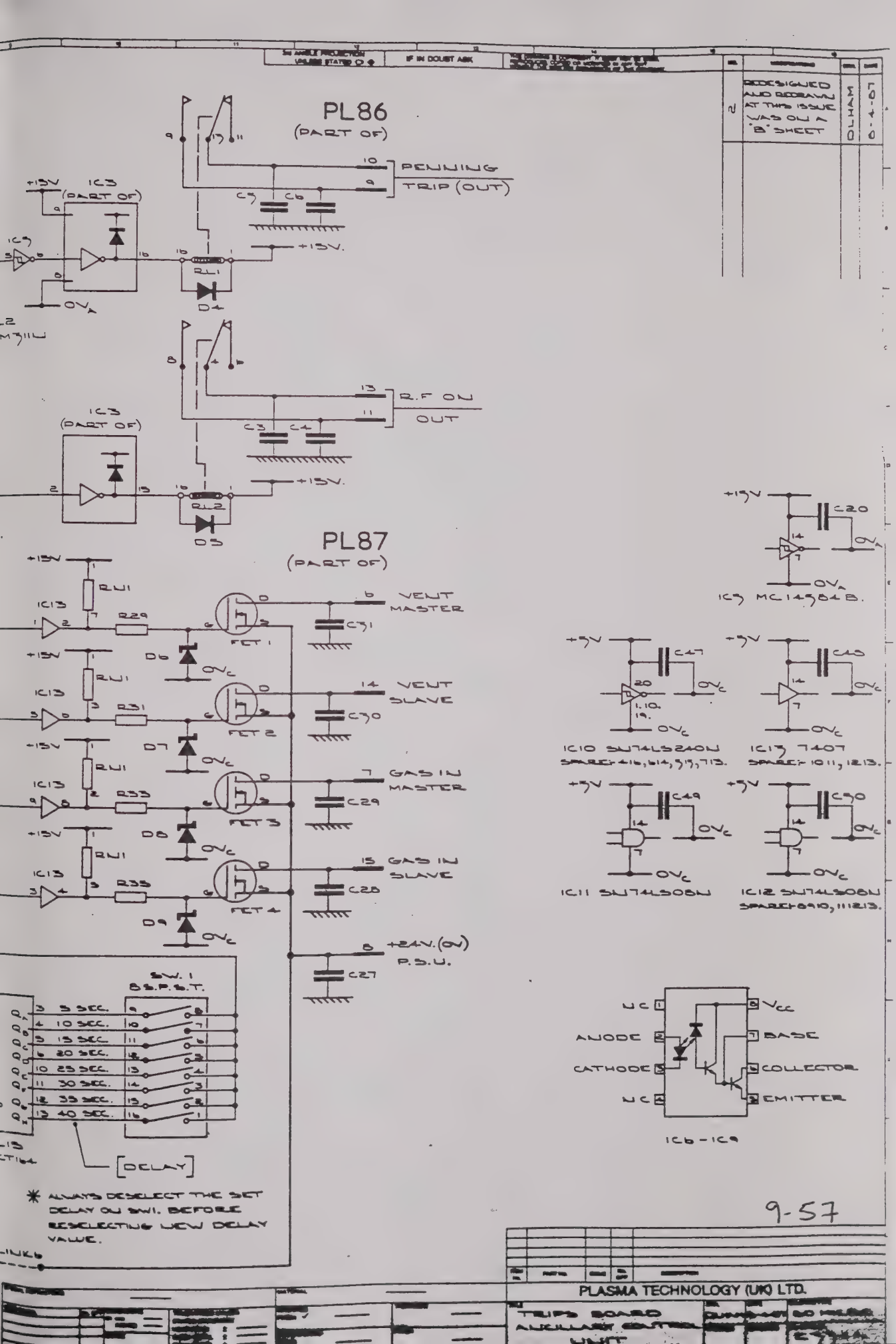
KEYSWITCH

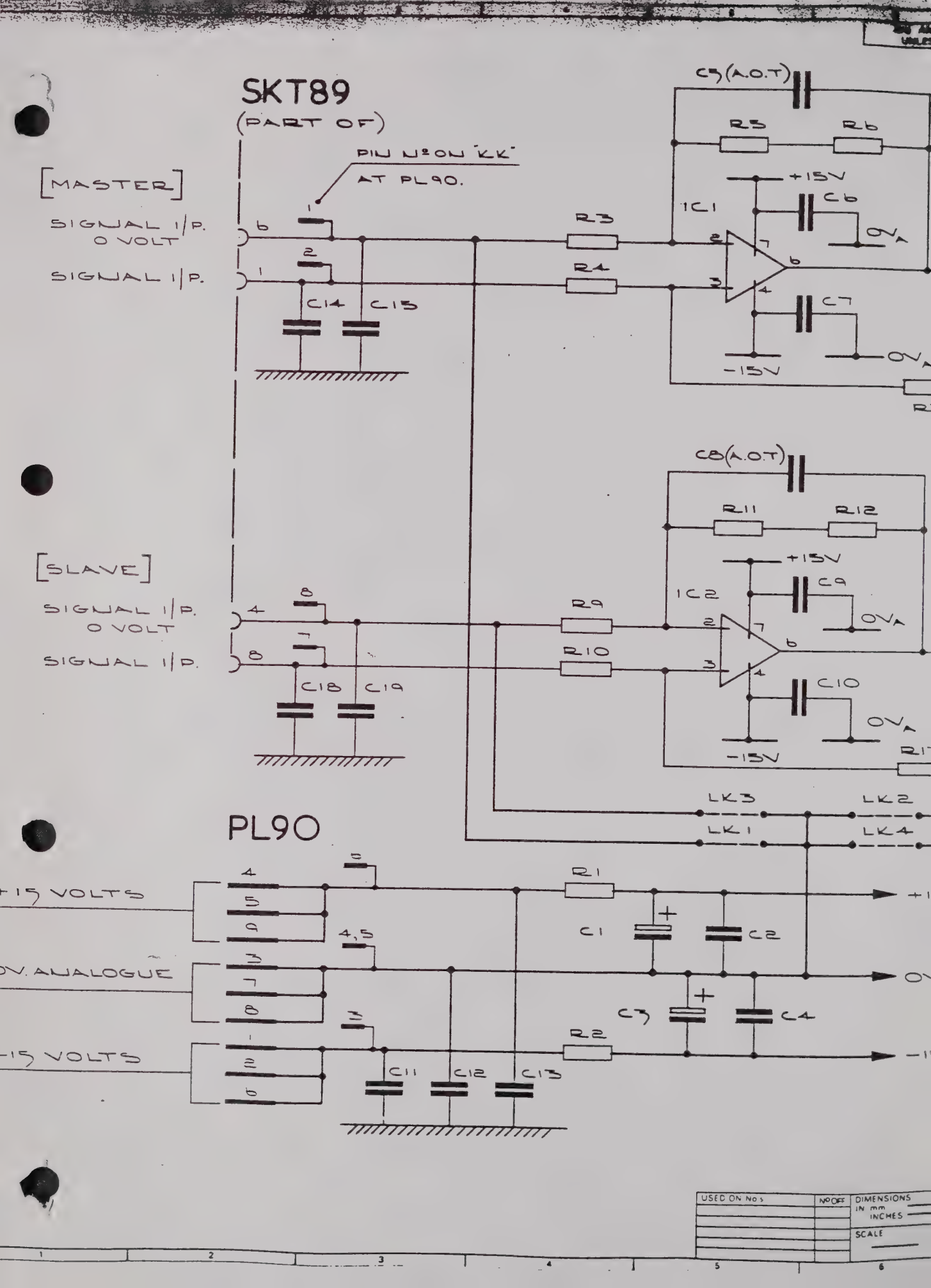
9.56

ERANCES UNLESS TED OTHERWISE CHINING ± ET METAL ± E POSNS ± LES ± ½"	MATERIAL		PLASMA TECHNOLOGY (UK) LTD.			
	MACHINED FINISH ✓	TREATMENT	TITLE KEYSWITCH WIRING BARATRONS 1TORR AND 10TORR. ANCILLARY CONTROL UNIT.	DRN DUHAM	DATE 1-6-57	MACHINE TYPE 80 MICRO
	REMOVE SHARP EDGES	FINISH		CHECKED	APPROVED	DRAWING No E3688.

9-56


PL86
(PART OF)
C17 (AOT)
R6
+15V
C11
C15
R10
L1
L2
R3
R4
C1
C2
D1
D2
R1
R2
R5
IC1
OP-07
C14
C16
C12
C17
R9
-15V
2K0
R12
+5V. REF.
C19
LINK1
D3
C7
IC5
IC5
IC5
R11
LK3
LK4
LINK2
PL87
(PART OF)
RESISTOR SPACE
IC6
6LI39
R20 R21
C40
R13
+24VOLTS
+24V(0V).
C33
C32
MASTER/SLAVE
(SWITCHED)
IC7
6LI39
R22 R23
C41
R14
R15
+24V. COMMON.
VENT
C35
C34
IC10
IC8
6LI39
R24 R25
C42
R16
R17
COMMON.
ROUGHING
C37
C36
IC12
IC9
6LI39
R26 R27
C43
R18
R19
+24V. COMMON.
TURBO
C39
C38
IC14
CD4060
R30
R29
C44
R36
R37
C46
IC10
IC4
REF 02
+5V
REF.
PL85
LINK3
+15 VOLTS
REG 1
7805
C25
C26
+5V.
+15V.
0V.
-15V.
C22
C21
C24
C23
C10
C9
C8


PL86
(PART OF)
PENNING
TRIP (OUT)
+15V
IC3
(PART OF)
IC9
RL1
D4
0V
R.F ON
OUT
RL2
D5
PL87
(PART OF)
RL1
IC13
R29
R31
R33
R35
D6
D7
D8
D9
FET 1
FET 2
FET 3
FET 4
VENT
MASTER
VENT
SLAVE
GAS IN
MASTER
GAS IN
SLAVE
+24V. (Ø)
P.S.U.
C31
C30
C29
C28
C27
SW. 1
8 S.P.S.T.
3 SEC.
10 SEC.
15 SEC.
20 SEC.
25 SEC.
30 SEC.
35 SEC.
40 SEC.
[DELAY]
* ALWAYS DESELECT THE SET DELAY ON SW1. BEFORE RESELECTING NEW DELAY VALUE.
C20
IC9 MC14584B.
C47
C48
IC10 SN74LS240N
SPARES: 4, 6, 14, 16, 18, 19.
IC13 7407
SPARES: 10, 11, 12, 13.
C49
C50
IC11 SN74LS08N
SPARES: 9, 10, 11, 12, 13.
IC12 SN74LS08N
SPARES: 8, 9, 10, 11, 12, 13.
N.C.
ANODE
CATHODE
N.C.
Vcc
BASE
COLLECTOR
EMITTER
IC6 - IC9
DESIGNED AND DRAWN AT THIS ISSUE. WAS ON A 'B' SHEET
DLHAM
6-4-87
9-57
PLASMA TECHNOLOGY (UK) LTD.
TRIPS BOARD
AUXILIARY CIRCUIT
UNIT



USED ON Nos	NO OFF	DIMENSIONS IN mm INCHES
		SCALE

IF IN DOUBT ASK

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ISS	MODIFICATIONS	DRN	DATE
-	INITIAL ISSUE	DLHAM	27-5-87

SKT89
(PART OF)

J N° ON "KK"
SKT 89.

1

[MASTER]

2 — SIGNAL O/P.

C16

2

7 — SIGNAL O/P.
O VOLT

R8

C17

3

[SLAVE]

9 — SIGNAL O/P.

C20

4

R14

5 — SIGNAL O/P.
O VOLT.

C21

VOLTS

ANALOGUE

VOLTS

9.58

ITEM NO	PART No	ISSUE	No OFF	DESCRIPTION

MATERIAL —

PLASMA TECHNOLOGY (UK) LTD.

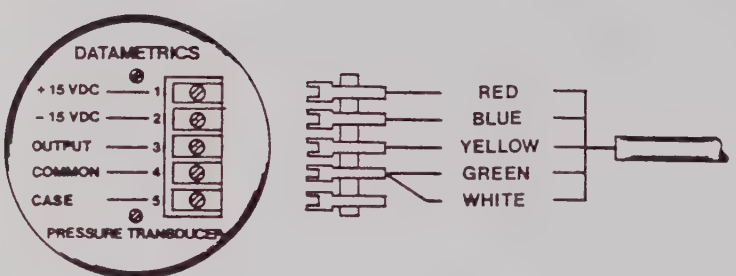
ERANCES UNLESS TED OTHERWISE
CHINING ± —
ET METAL ± —
E POS'NS ± —
LES ± 1/2" —

MACHINED FINISH ✓ —
TREATMENT —
REMOVE SHARP EDGES —
FINISH —

TITLE BARATRON DIFFERENTIAL GAIN AMPLIFIER BOARD.

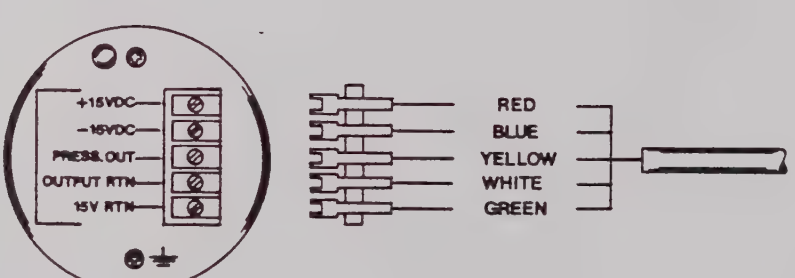
DRN	DATE	MACHINE TYPE
DLHAM	27/5/87	80 MICRO
CHECKED	APPROVED	DRAWING No
		E3628

9-58



DATAMETRICS – 10 TORR

VACUUM G



MKS INSTRUMENTS INC. – 10 TORR

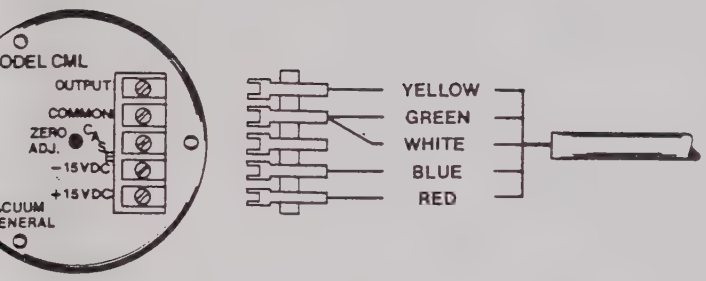
VACUUM G

MASTER UNIT, AND SLAVE SE80 BARREL UNIT ONLY. (80 SYSTEM)

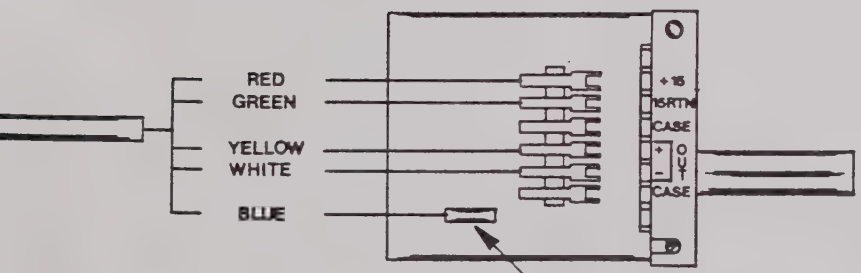
USED ON Nos	No OFF	DIMENSION IN mm INCHES
		SCALE

E PROJECTION STATED	IF IN DOUBT ASK	THIS DRAWING IS COPYRIGHT IT MUST NOT BE REPRODUCED COPIED OR MODIFIED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF THE COMPANY

ISS	MODIFICATIONS	DRN	DATE
–	INITIAL ISSUE	DLHAM	29-1-86



AL – 10 TORR



SLEEVE WIRE ADJACENT TO CONNECTOR,

–15VOLTS MUST NOT BE SUPPLIED TO UNIT

AL – 1 TORR

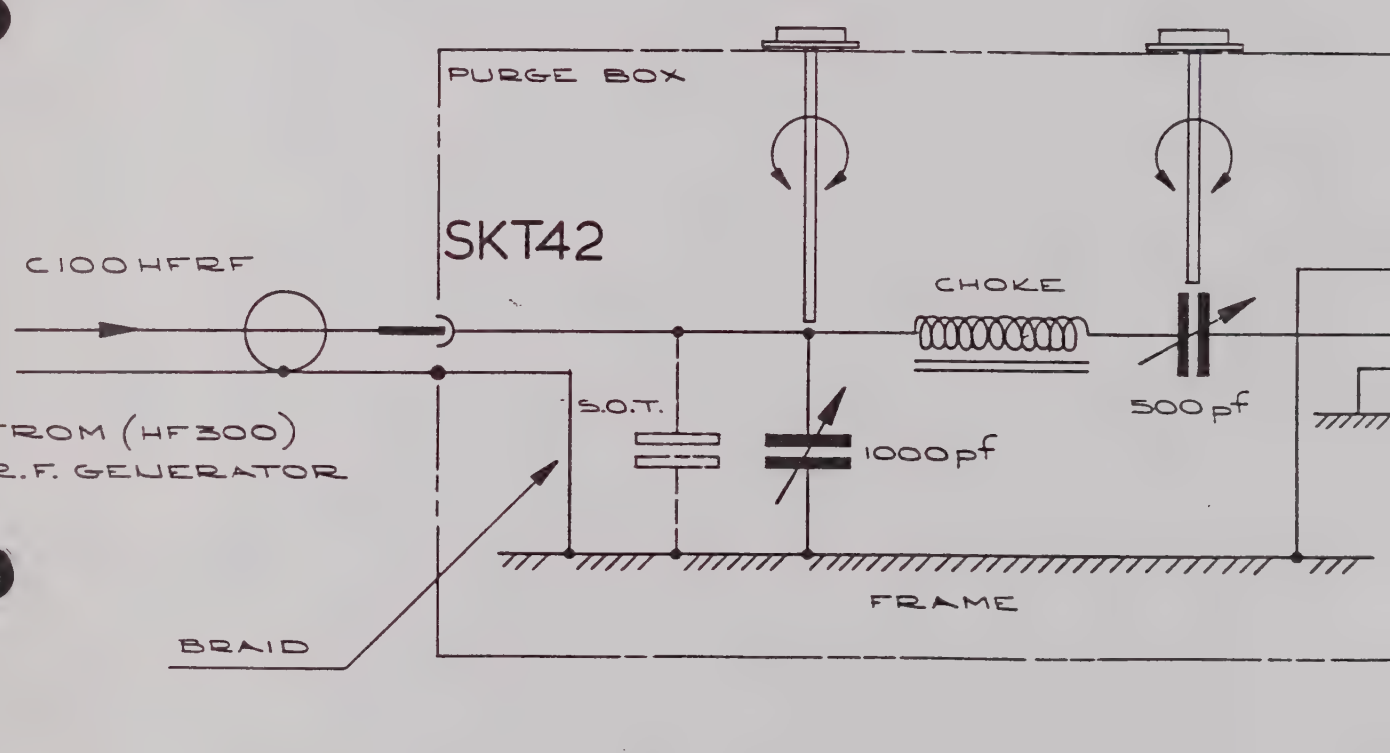
SHEET 1 OF 2 SHEETS.

ITEM NO	PART No	ISSUE	No OFF	DESCRIPTION
				9.66

TOLERANCES UNLESS STATED OTHERWISE	MATERIAL	PLASMA TECHNOLOGY (UK) LTD.			
MACHINING ± ——	MACHINED FINISH ✓ ——	TREATMENT ——	TITLE BARATRON WIRING	DRN DLHAM	DATE 29/1/86
SHEET METAL ± ——	REMOVE SHARP EDGES ——	FINISH ——		CHECKED	APPROVED
HOLE POSNS ± ——					DRAWING No. E281B
ANGLES ± ½° ——					

MACHINE TYPE ——

9-66



USED ON No 8	NO OFF	DIMENSIONS IN mm INCHES
		SCALE

7	8	9	10	11

NGLE PROJECTION SS STATED

IF IN DOUBT ASK

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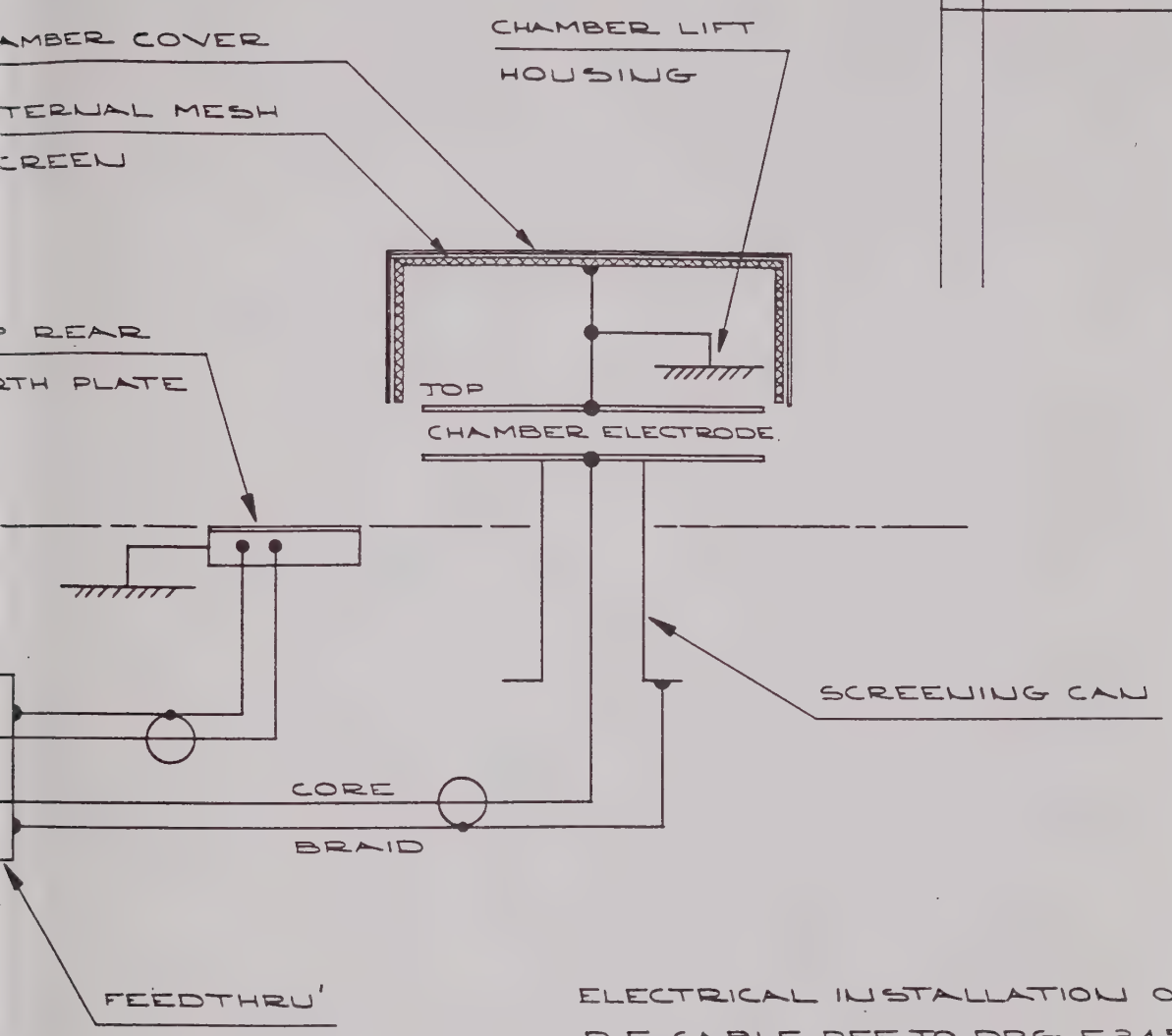
ISS	MODIFICATIONS	DRN	DATE
R	INITIAL ISSUE	DLHAM	7-1-86



ELECTRICAL INSTALLATION OF R.F. CABLE, REF TO DRG E245A-SHEET 1.

MASTER UNIT & SLAVE CHAMBER UNIT

ITEM NO	PART No	ISSUE	No OFF	DESCRIPTION
				9.67

PLASMA TECHNOLOGY (UK) LTD.

TOLERANCES UNLESS STATED OTHERWISE	MATERIAL		TITLE	DRN	DATE	MACHINE TYPE
MACHINING ±	MACHINED FINISH ✓	TREATMENT	WIRING DIAGRAM HIGH FREQUENCY RF CABLES.	DLHAM	7/1/86	RIE 80
SHEET METAL ±	REMOVE SHARP EDGES	FINISH		CHECKED	APPROVED	DRAWING No. E271B
HOLE POS'NS ±						
ANGLES ± ½°						

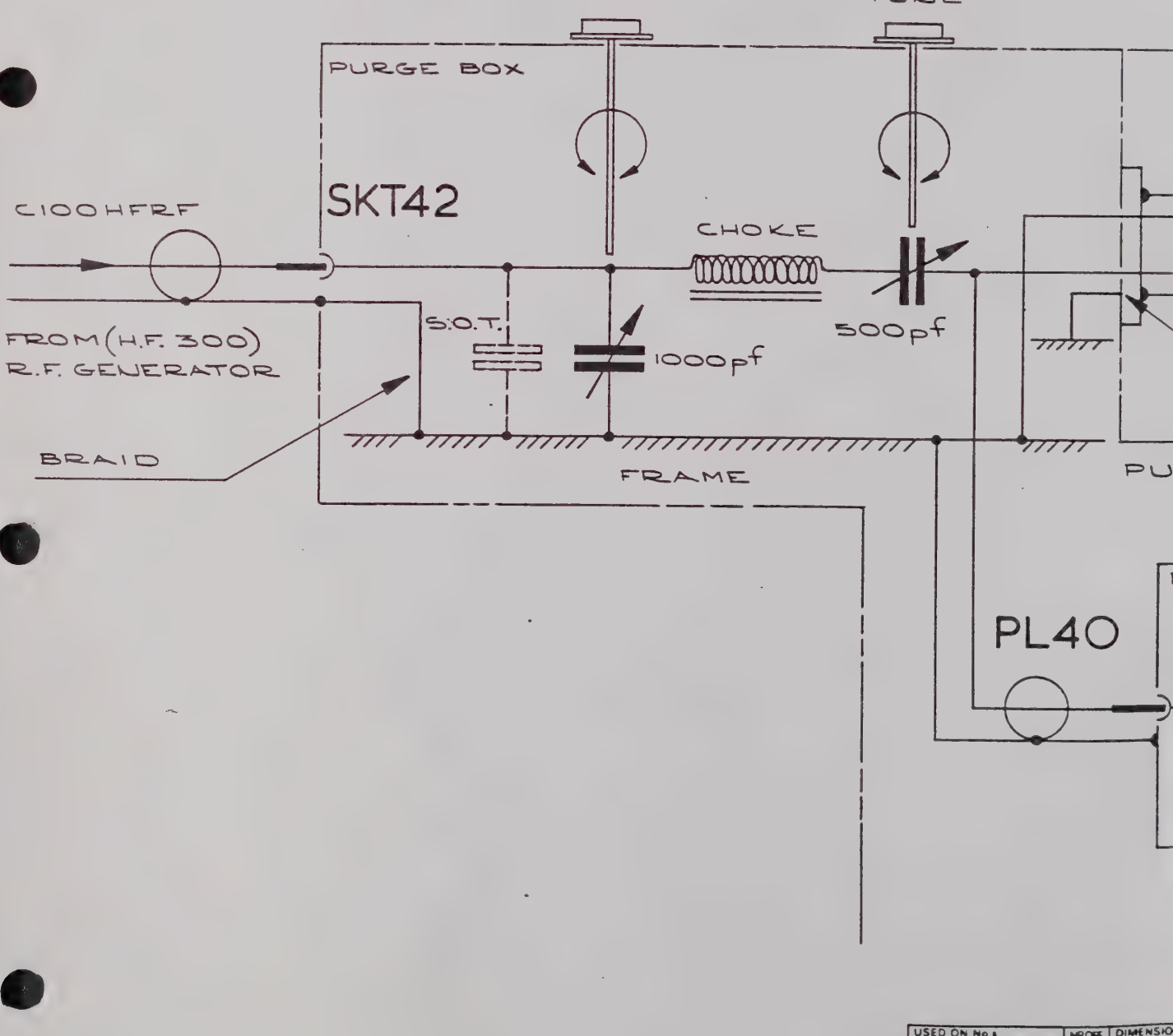
9-67

FOR ELECTRICAL INSTALLATION

OF R.F. CABLE, REF TO DRAWING:-
E245A, SHEET 1.

TOP

EAR



USED ON No 8	NO OFF	DIMENSIO IN mm INCHE
		SCALE

GLE PROJECTION S STATED

IF IN DOUBT ASK

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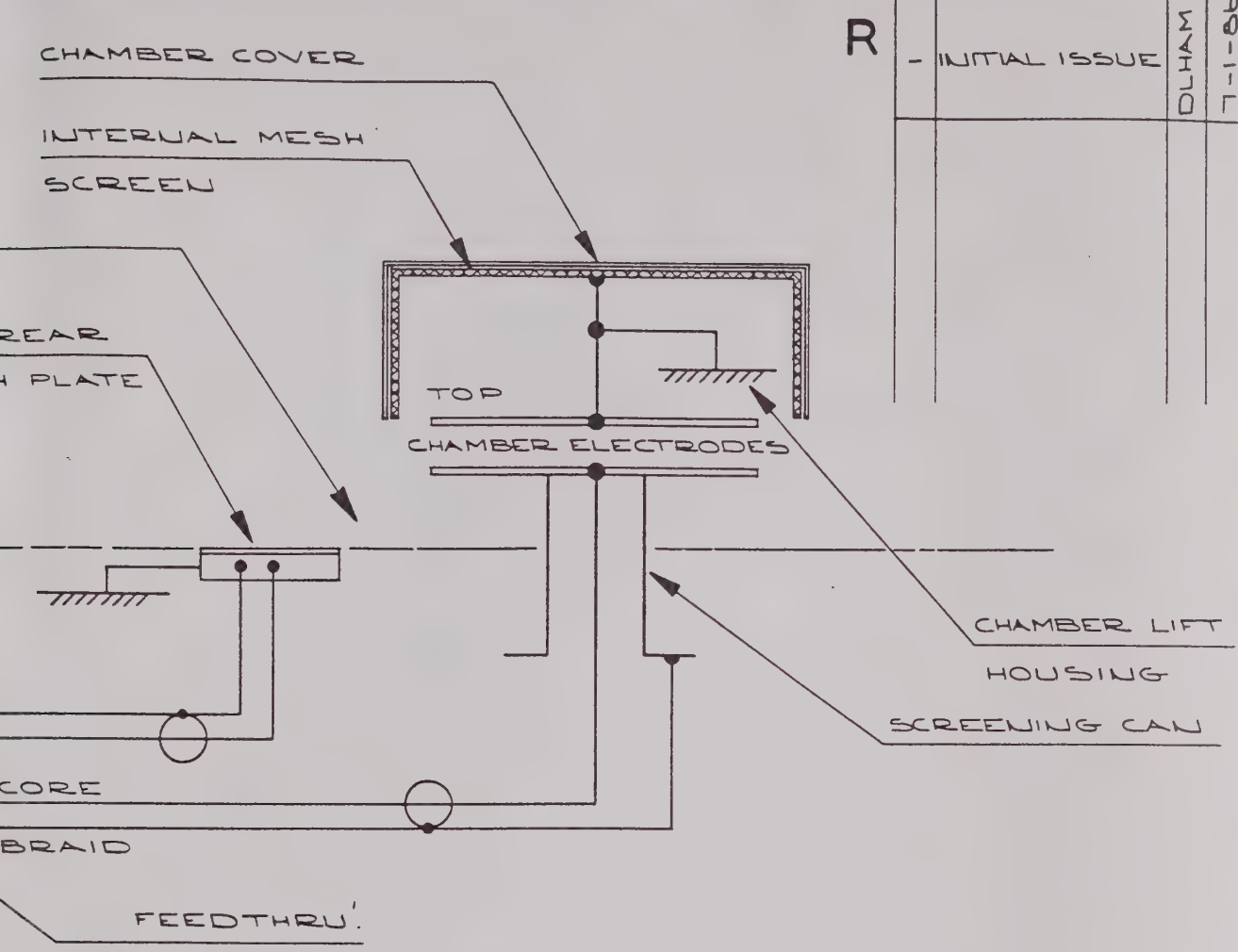
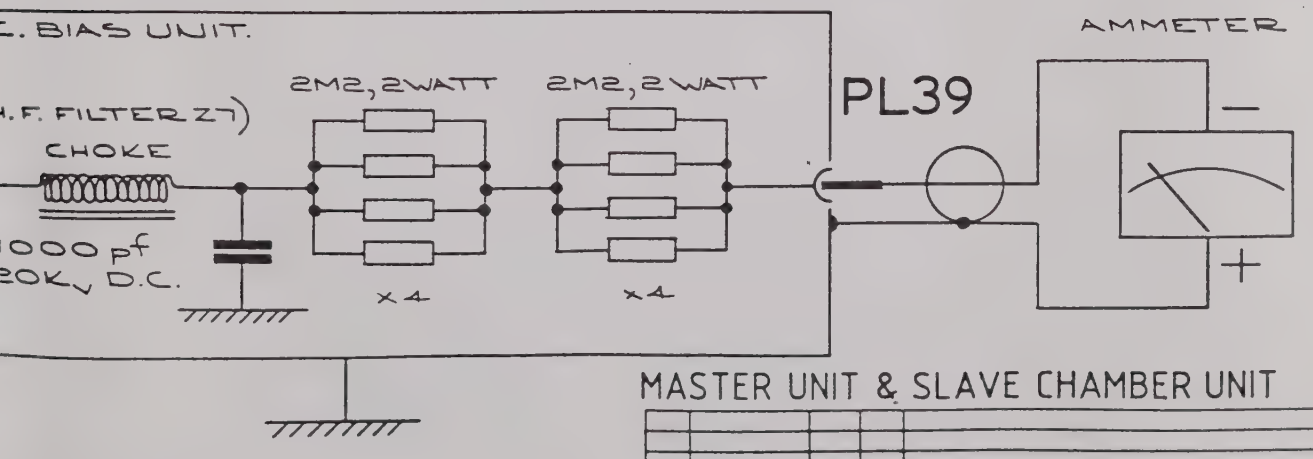
ISS	MODIFICATIONS	DRN	DATE
R	- INITIAL ISSUE	DLHAM	6-1-67





MASTER UNIT & SLAVE CHAMBER UNIT

ITEM NO	PART No	ISSUE	No OFF	DESCRIPTION

9.68

MATERIAL

PLASMA TECHNOLOGY (UK) LTD.

TOLERANCES UNLESS STATED OTHERWISE
MACHINING ±
SHEET METAL ±
HOLE POS'NS ±
ANGLES ± ½°

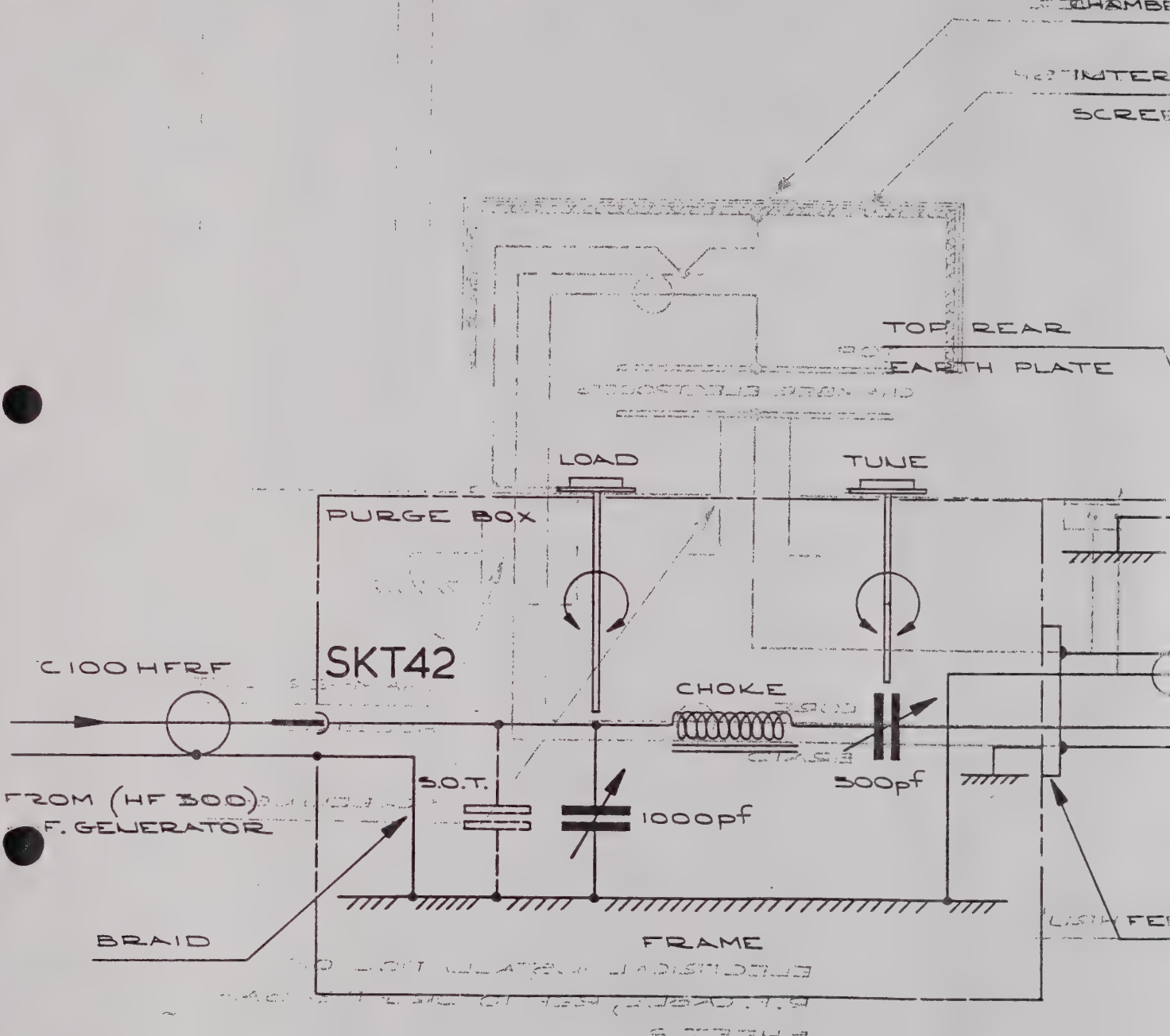
MACHINED FINISH ✓ | TREATMENT

REMOVE SHARP EDGES | FINISH

TITLE WIRING DIAGRAM HIGH FREQUENCY R.F. CABLES AND D.C. BIAS.

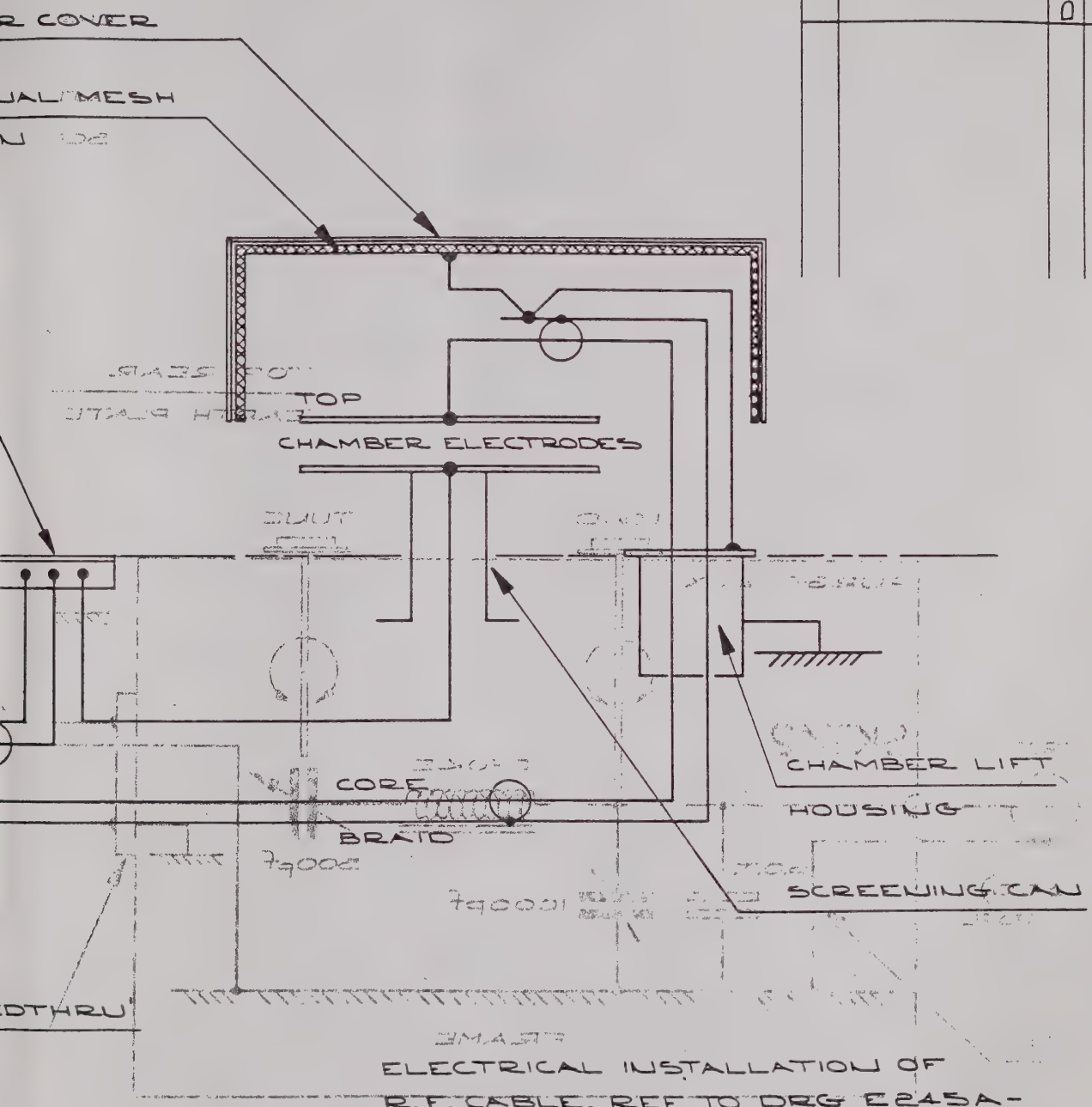
DRN	DATE	MACHINE TYPE
DLHAM	7/1/66	RIE 80
CHECKED	APPROVED	DRAWING No
		E272B

9-68


TOP REAR
EARTH PLATE
LOAD
TUNE
PURGE BOX
SKT42
C100 HFRF
CHOKE
S.O.T.
500pf
1000pf
FROM (HF 300)
F. GENERATOR
BRAID
FRAME

PROJECTION STATED	IF IN DOUBT ASK	THIS DRAWING IS COPYRIGHT IT MUST NOT BE REPRODUCED COPIED OR MODIFIED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF THE COMPANY

ISS	MODIFICATIONS	DRN	DATE
R	- INITIAL ISSUE	DLHAM	9-1-69



ELECTRICAL INSTALLATION OF R.F. CABLE, REF TO DRG E245A-SHEET 2.

MASTER UNIT & SLAVE CHAMBER UNIT

ITEM NO	PART No	ISSUE	No OFF	DESCRIPTION
				9.69

PLASMA TECHNOLOGY (UK) LTD.

TOLERANCES UNLESS STATED OTHERWISE	MATERIAL	TREATMENT	TITLE	DRN	DATE	MACHINE TYPE
MACHINING ±	MACHINED FINISH ✓		WIRING DIAGRAM HIGH FREQUENCY R.F CABLES.	DLHAM	7/1/86	D.P. 80
SHEET METAL ±	REMOVE SHARP EDGES	FINISH		CHECKED	APPROVED	DRAWING No E269B
HOLE POS'NS ±						
ANGLES ± ½						

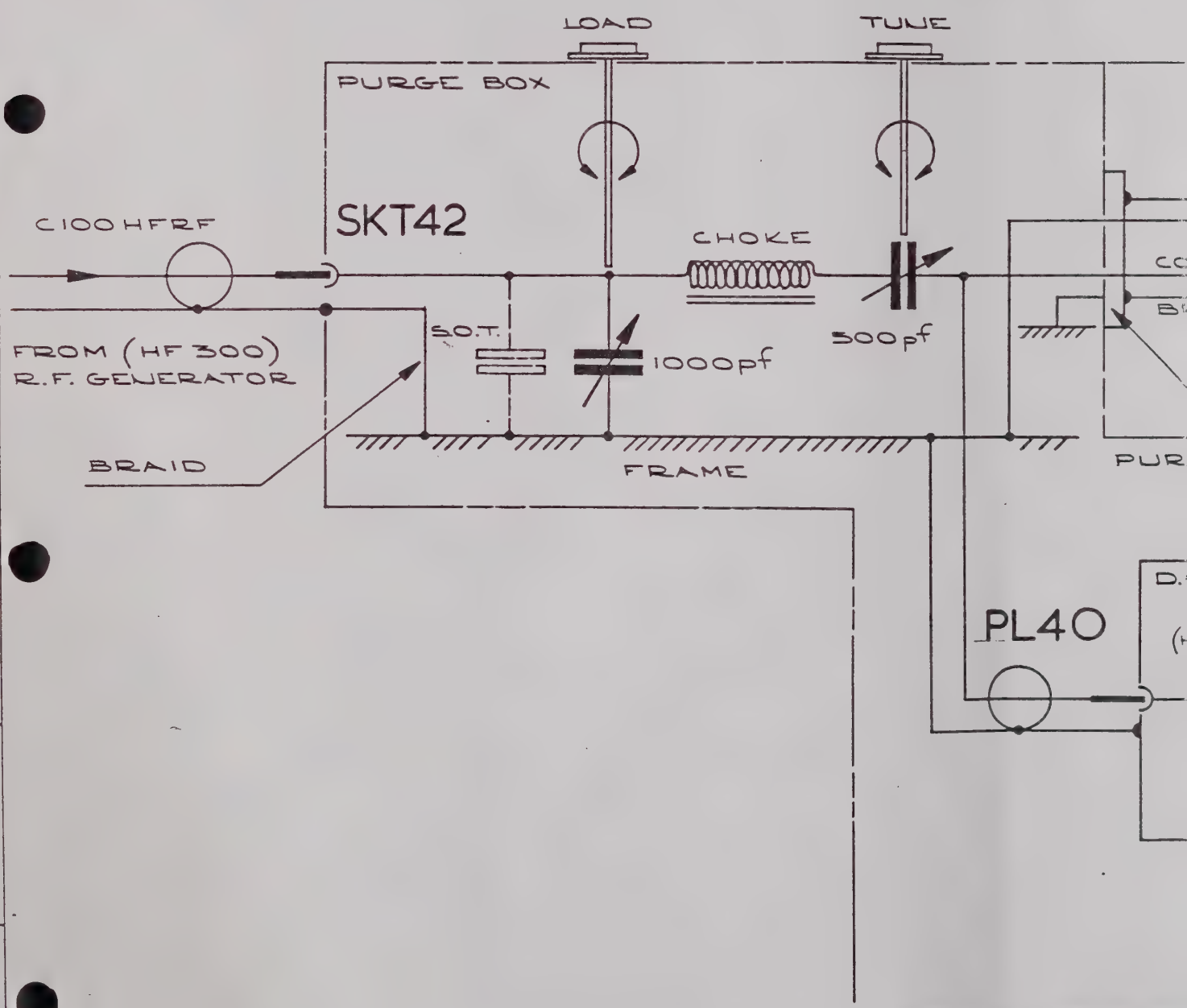
9-69

FOR ELECTRICAL INSTALLATION

OF R.F. CABLE, REF TO DRAWING:-
E243A, SHEET 2.

TOP REA

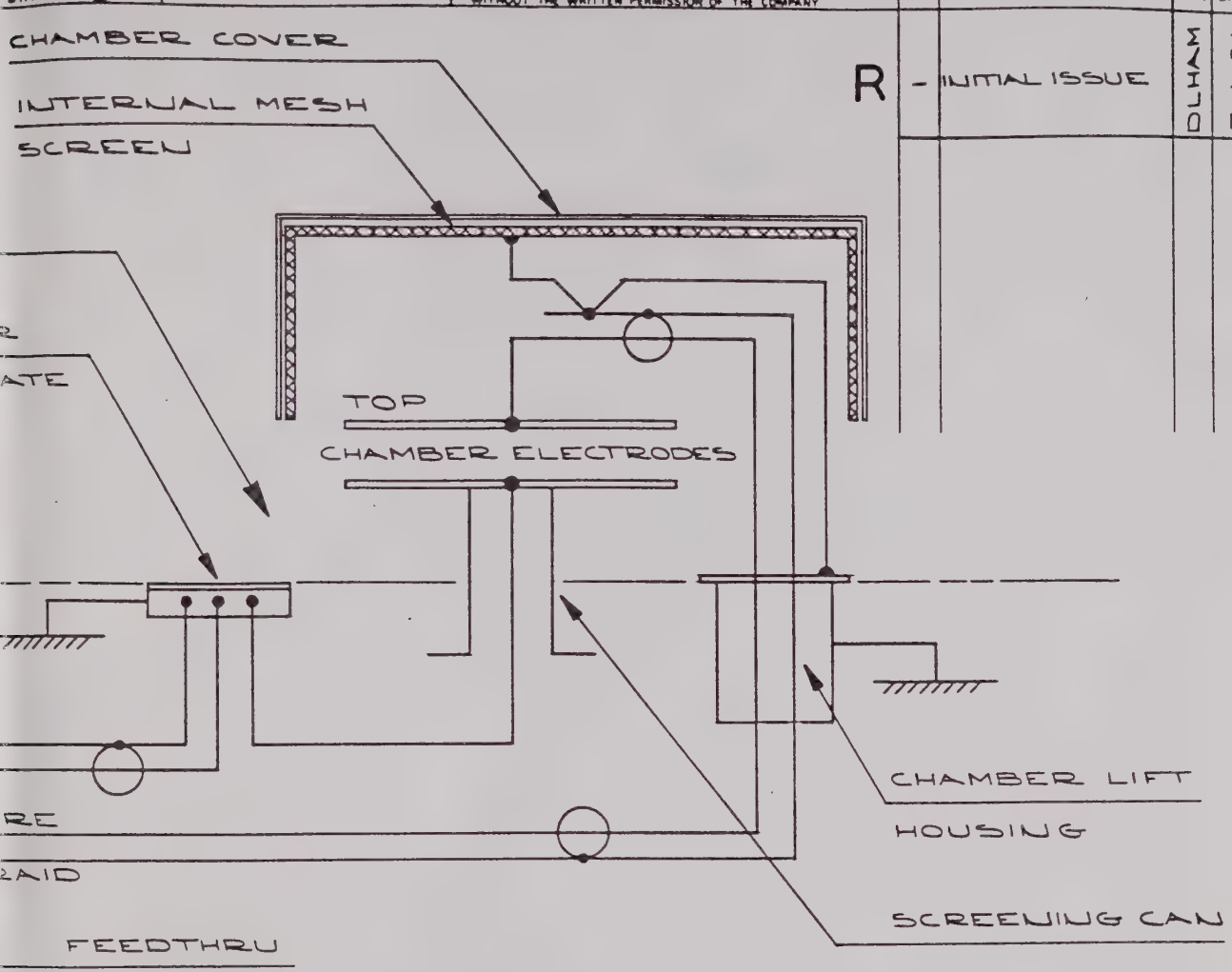
EARTH PL

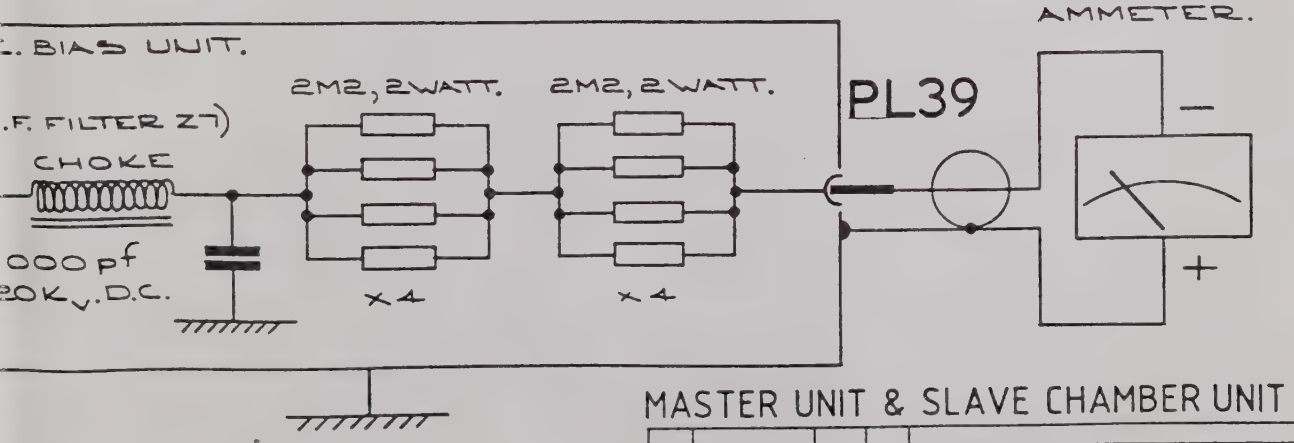


USED ON No's	NO OFF	DIMENSIONS IN mm / INCHES
		SCALE

LE PROJECTION STATED
IF IN DOUBT ASK
THIS DRAWING IS COPYRIGHT. IT MUST NOT BE REPRODUCED, COPIED OR MODIFIED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF THE COMPANY

ISS	MODIFICATIONS	DRN	DATE
R	- INITIAL ISSUE	DLHAM	20-1-71





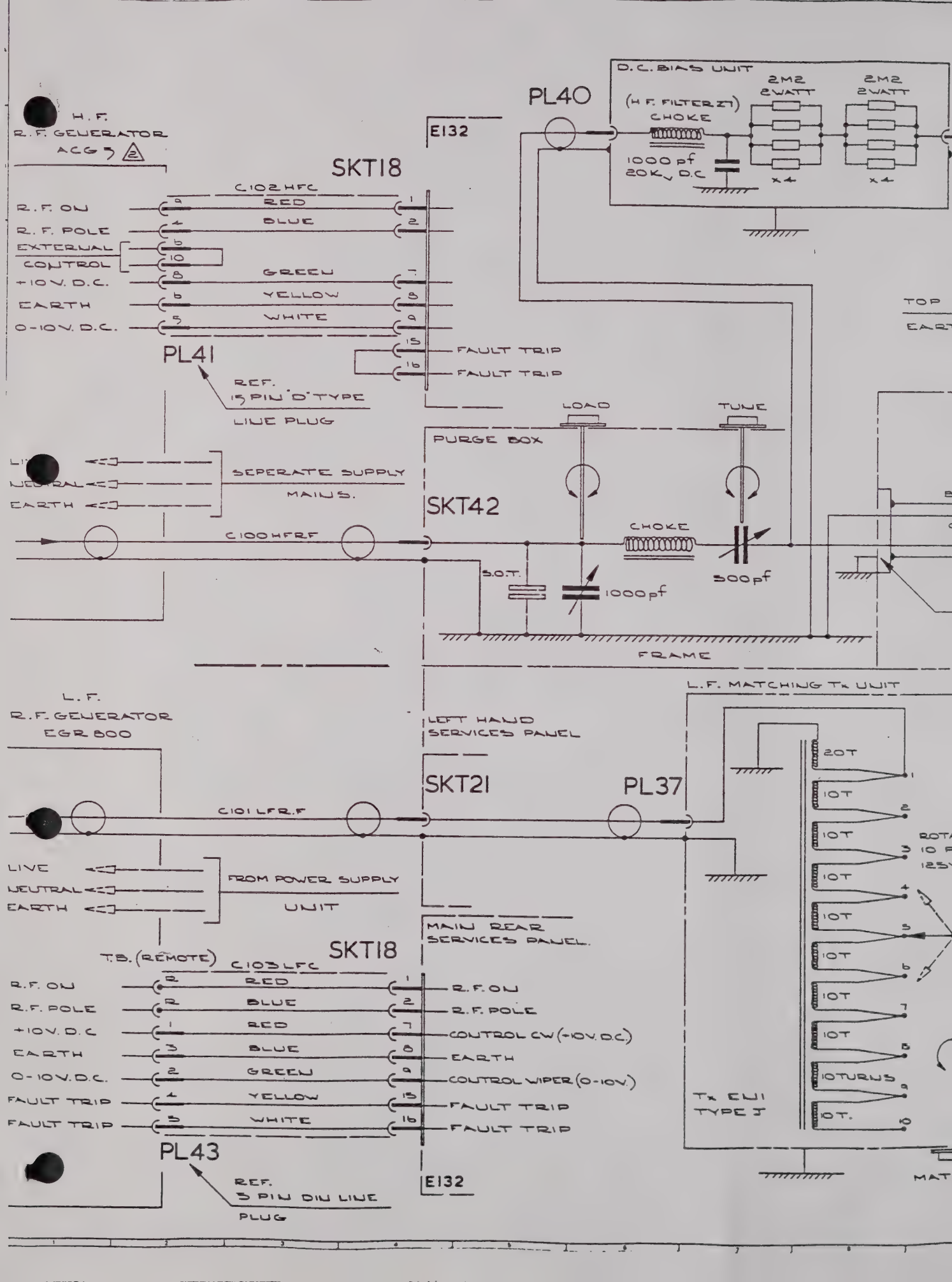
MASTER UNIT & SLAVE CHAMBER UNIT

ITEM NO	PART No	ISSUE	No OFF	DESCRIPTION
				9.70

PLASMA TECHNOLOGY (UK) LTD.

TOLERANCES UNLESS STATED OTHERWISE	MATERIAL	TREATMENT	TITLE	DRN	DATE	MACHINE TYPE
MACHINING ±	MACHINED FINISH ✓		WIRING DIAGRAM HIGH FREQUENCY R.F. CABLES AND D.C. BIAS.	DLHAM	7/1/86	D.P. 80
SHEET METAL ±	REMOVE SHARP EDGES	FINISH		CHECKED	APPROVED	DRAWING No E270B
HOLE POSITNS ±						
ANGLES ± ½°						

9-70


H.F.
R.F. GENERATOR
ACG 7 (2)
SKT18
C102HFC
R.F. ON
R.F. POLE
EXTERNAL CONTROL
+10V. D.C.
EARTH
0-10V. D.C.
RED
BLUE
GREEN
YELLOW
WHITE
FAULT TRIP
FAULT TRIP
PL41
REF. 15 PIN 'D' TYPE LINE PLUG
E132
PL40
D.C. BIAS UNIT
(H.F. FILTER Z1)
CHOKE
1000 pf 20K V D.C
2M2 2WATT
2M2 2WATT
x4
x4
TOP
EAR
LOAD
TUNE
PURGE BOX
SEPERATE SUPPLY MAINS.
LIVE
NEUTRAL
EARTH
SKT42
C100HFRF
CHOKE
5.O.T.
1000pf
500pf
FRAME
L.F.
R.F. GENERATOR
EGR 800
LEFT HAND SERVICES PANEL
SKT21
PL37
C101LFR.F
L.F. MATCHING Tx UNIT
20T
10T
10T
10T
10T
10T
10T
10T
10TURNS
10T.
ROTA
10 P
125
LIVE
NEUTRAL
EARTH
FROM POWER SUPPLY UNIT
MAIN REAR SERVICES PANEL.
T.B. (REMOTE)
SKT18
C103LFC
R.F. ON
R.F. POLE
+10V. D.C
EARTH
0-10V. D.C.
FAULT TRIP
FAULT TRIP
RED
BLUE
RED
BLUE
GREEN
YELLOW
WHITE
R.F. ON
R.F. POLE
CONTROL CW (+10V. D.C.)
EARTH
CONTROL WIPER (0-10V.)
FAULT TRIP
FAULT TRIP
Tx ENJ TYPE J
PL43
REF. 5 PIN DIN LINE PLUG
E132
MAT

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ISS	MODIFICATIONS	DRN	DATE
R	INITIAL ISSUE	DLHAM	7-1-86
2	ACG3 ENI GENERATOR VAS HF300 PL41 VASA 3 PIN DIN	DLHAM	20-3-86

AMMETER

CHAMBER LIFT BEAM

CHAMBER COVER

INTERNAL MESH SCREEN

* SEE NOTE

CHAMBER ELECTRODES

BRAID

CHAMBER LIFT HOUSING

CORE

BRAID

SCREENING CAN

FOR ELECTRICAL INSTALLATION OF R.F. CABLE, REF TO DRAWING E245A SHEET 3.

PL38

CORE

BRAID

* IMPORTANT

ONLY ONE R.F. CABLE, EITHER L.F. OR H.F. IS ATTACHED TO THE TOP ELECTRODE DURING OPERATION.

MASTER UNIT & SLAVE CHAMBER UNIT

ITEM No	PART No	ISSUE	No OFF	DESCRIPTION
				9.71

MATERIAL

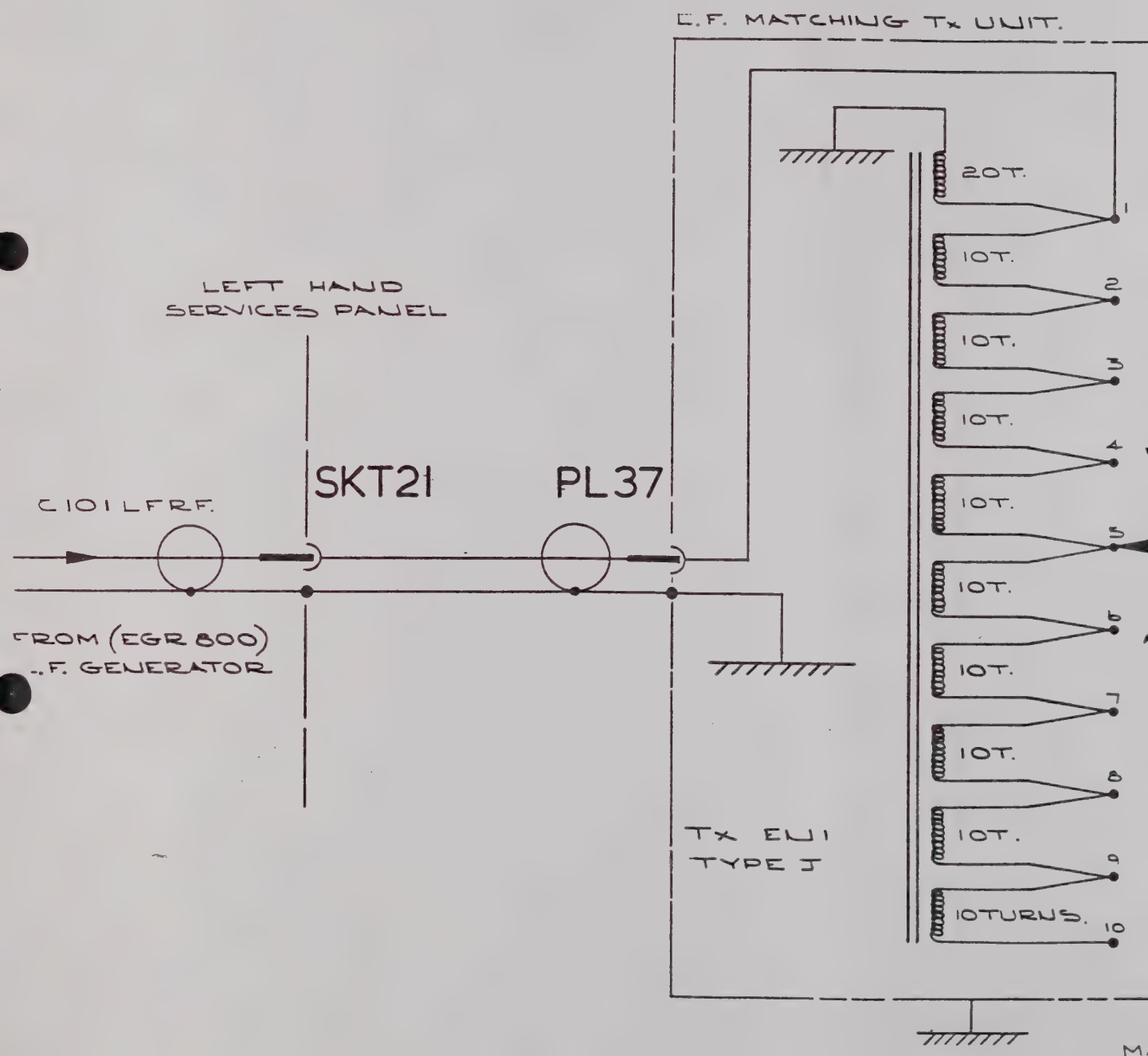
PLASMA TECHNOLOGY (UK) LTD.

No OFF	DIMENSIONS IN mm / INCHES	TOLERANCES UNLESS STATED OTHERWISE	MACHINED ✓ FINISH	TREATMENT
	SCALE	MACHINING ±	REMOVE SHARP EDGES	FINISH
		SHEET METAL ±		
		HOLE POSNS ±		
		ANGLES ± 1/2°		

TITLE WIRING DIAGRAM LOW AND HIGH R.F. FREQUENCY CABLES MASTER UNIT.

DRN	DATE	MACHINE TYPE
DJMM	7/1/86	D.P. 80
CHECKED	APPROVED	DRAWING No
		E260A

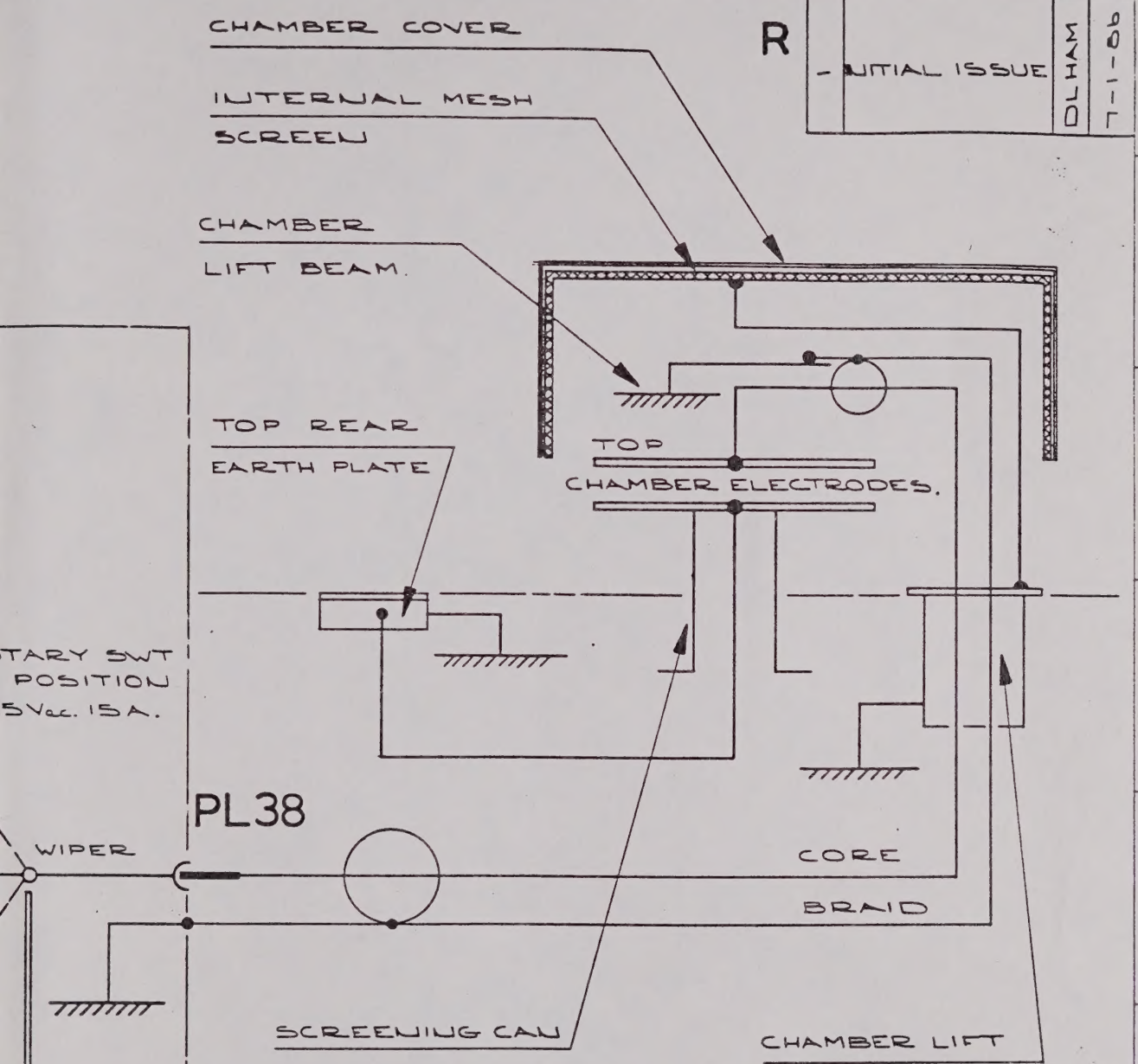
9-71



USED ON No's	No OFF	DIMENSIONS IN mm INCHES
		SCALE

E PROJECTION STATED	IF IN DOUBT ASK	THIS DRAWING IS COPYRIGHT IT MUST NOT BE REPRODUCED COPIED OR MODIFIED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF THE COMPANY

ISS	MODIFICATIONS	DRN	DATE
R	- INITIAL ISSUE	DLHAM	9-1-72



FOR ELECTRICAL INSTALLATION OF R.F. CABLE, REF TO DRAWING:- E245A, SHEET 4.

MASTER UNIT & SLAVE CHAMBER UNIT

ITEM NO	PART No	ISSUE	No OFF	DESCRIPTION
				9.72

MATERIAL —

PLASMA TECHNOLOGY (UK) LTD.

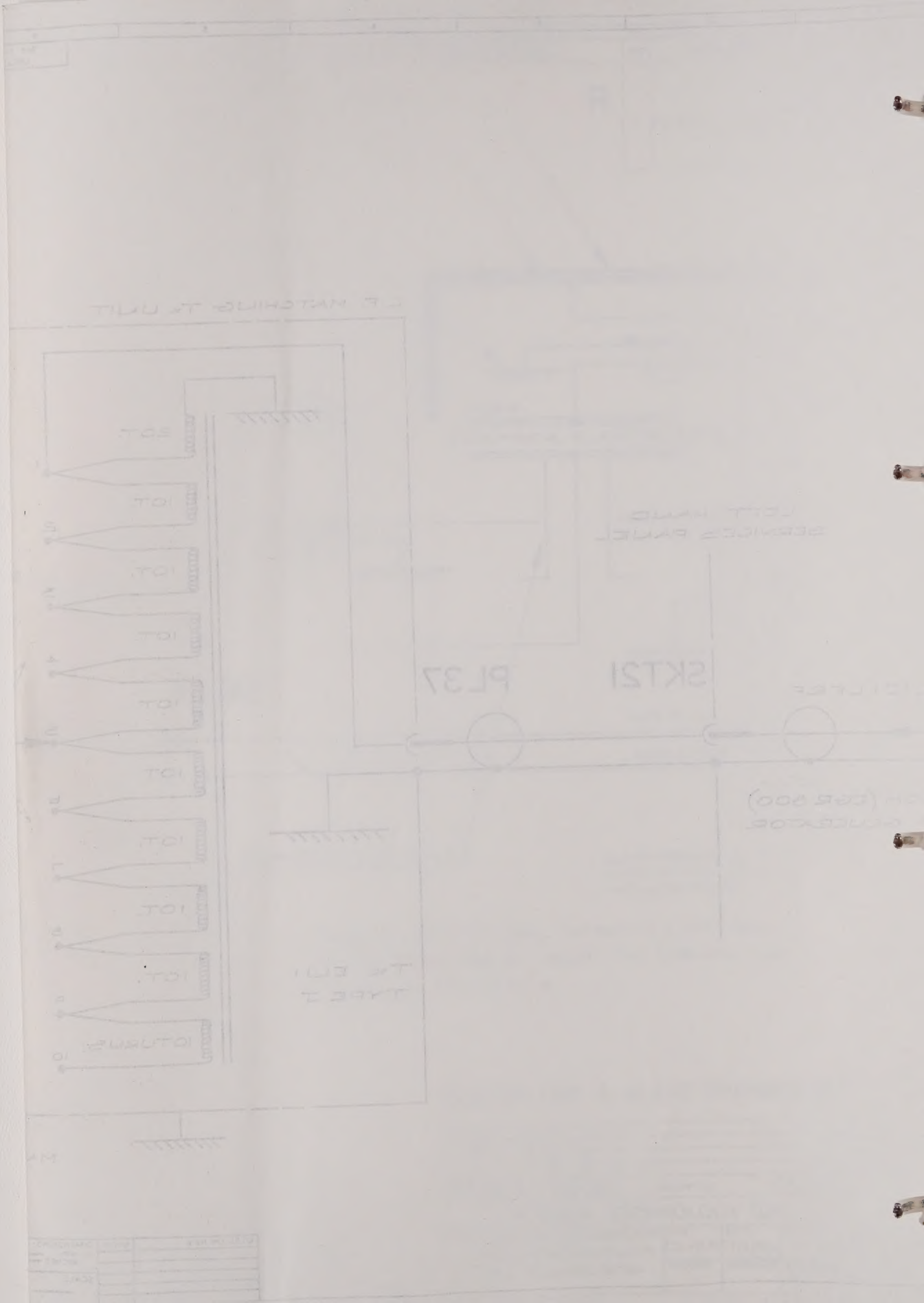
TOLERANCES UNLESS STATED OTHERWISE
MACHINING ± —
SHEET METAL ± —
HOLE POS'NS ± —
ANGLES ± ½° —

MACHINED FINISH ✓ — TREATMENT —
REMOVE SHARP EDGES — FINISH —

TITLE WIRING DIAGRAM LOW FREQUENCY RF CABLES

DRN	DATE	MACHINE TYPE
DLHAM	7/1/86	DP 80
CHECKED	APPROVED	DRAWING No.
		E273B

9-72



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